

This document gives pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a Major, Municipal permit. The discharge results from the operation of a 4.0 MGD wastewater treatment plant with additional flow tiers of 8 and 13 MGD. This permit action consists of updating the proposed effluent limits to reflect the current Virginia WQS and updating permit language, as appropriate, to reflect current boilerplate. The effluent limitations and special conditions contained in this permit will maintain the Water Quality Standards of 9VAC25-260-00 et seq.

1. Facility Name and Mailing Address: Little Falls Run WWTP  
P.O. Box 339  
Stafford, VA 22555-0339  
SIC Code : 4952 WWTP  
Facility Location: 952 Kings Highway  
Fredericksburg, VA  
County: Stafford  
Facility Contact Name: Mr. Mike Smith  
Assistant Director of Utilities  
Telephone Number: (540) 658-8620
2. Permit No.: VA0076392  
Expiration Date of previous permit: June 12, 2010  
Other VPDES Permits associated with this facility: VAR051420, VAN020031  
Other Permits associated with this facility: Air Registration No 73771  
E2/E3/E4 Status: Not Applicable
3. Owner Name: Stafford County Board of Supervisors  
Owner Contact/Title: Mr. Harry Critzer  
Director of Utilities  
Telephone Number: (540) 658-8600
4. Application Complete Date: September 16, 2009  
Permit Drafted By: Alison Thompson  
Date Drafted: 4/2/2010; 6/14/2010  
Draft Permit Reviewed By: Joan Crowther  
Date Reviewed: 6/18/2010  
Public Comment Period : Start Date: 8/26/2010  
End Date: 9/25/2010
5. Receiving Waters Information: See Attachment 1 for the Flow Frequency Determination for river flows at the fall line which are used for determining the Instream Waste Concentrations.  
Receiving Stream Name : Rappahannock River  
River Mile: 3-RPP104.6  
Stream Basin: Rappahannock  
Subbasin: None  
Section: I  
Stream Class: II  
Special Standards: a  
Waterbody ID: VAN-E20E; RA46  
7Q10 Low Flow: tidal  
7Q10 High Flow: tidal  
1Q10 Low Flow: tidal  
1Q10 High Flow: tidal  
Harmonic Mean Flow: tidal  
30Q5 Flow: tidal  
303(d) Listed: Yes  
30Q10 Flow: tidal  
TMDL Approved: Yes (Bacteria)  
Date TMDL Approved: 5/5/2008
6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:
 

<u>✓</u> State Water Control Law <u>✓</u> Clean Water Act <u>✓</u> VPDES Permit Regulation <u>✓</u> EPA NPDES Regulation	<u>✓</u> EPA Guidelines <u>✓</u> Water Quality Standards <u>      </u> Other
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7. Licensed Operator Requirements: Class I

8. Reliability Class: Class I

9. Permit Characterization:

<input type="checkbox"/> Private	<input checked="" type="checkbox"/> Effluent Limited	<input type="checkbox"/> Possible Interstate Effect
<input type="checkbox"/> Federal	<input checked="" type="checkbox"/> Water Quality Limited	<input type="checkbox"/> Compliance Schedule Required
<input type="checkbox"/> State	<input checked="" type="checkbox"/> Toxics Monitoring Program Required	<input type="checkbox"/> Interim Limits in Permit
<input checked="" type="checkbox"/> POTW	<input checked="" type="checkbox"/> Pretreatment Program Required	<input type="checkbox"/> Interim Limits in Other Document
<input checked="" type="checkbox"/> TMDL		

10. **Wastewater Sources and Treatment Description:**

The Little Falls Run Wastewater Treatment Plant began operations in June 1991, replacing Stafford County's Claiborne Run Sewage Treatment Plant. The wastewater treatment system consists of preliminary treatment with mechanical bar screens and grit and grease removal followed by biological treatment with a Schreiber counter-current, low load aeration system to provide biological nutrient removal. There are two 4 MGD Schreiber units that are currently alternated for treatment. The Schreiber process is followed by clarification, lime and alum addition, tertiary sand/anthracite filters, ultraviolet light disinfection, and post aeration via rip rap in the outfall channel prior to discharge in the Rappahannock River.

Stafford County is upgrading this facility in two phases. The facility is currently undergoing Phase I expansion and upgrade under a WQIF grant to install Enhanced Nutrient Removal (ENR) to meet its wasteload allocation and to accommodate additional flow. The current CTO is for 4 MGD and the average flows to the facility have been >95% of capacity. The project funded under the current grant agreement addresses Phase I and will upgrade the facility from BNR performance to ENR treatment capable of attaining annual average effluent TN of 6.0 mg/L and TP of 0.30 mg/L at a design flow of 8.0 MGD\*. Phase I upgrades will change the Schreiber trains to work in parallel with the addition of cyclical aeration controls to improve the nitrification/denitrification process. This phase also includes adding additional ultraviolet disinfection, adding digesters and upgrading the bar racks. The internal recycle rate will also be increased to accommodate greater nitrate removal. The project is scheduled for completion later in the summer of 2010 and will bring the design capacity of the facility to 8.0 MGD in Phase I.

\*NOTE: Little Falls Run was hydraulically sized for 8.0 MGD during the original construction of the Schreiber units. The WQIF grant had performance requirements for a 6 MGD facility in the Phase I project – 5.0 mg/L Total Nitrogen annual average and 0.30 mg/L Total Phosphorus annual average. Stafford County had their consultant submit paperwork for the re-rating of the Phase I project from 6.0 to 8.0 MGD to recognize the full hydraulic capacity of the Schreiber units. With the re-rating, the Total Nitrogen performance changed from 5.0 mg/L to 6.0 mg/L. The permit will have two 8.0 MGD flow tiers; one for Phase I and one for Phase II when the full ENR treatment capabilities are constructed. The WQIF grant is pro-rated accordingly.

The discharge location is identified on the attached USGS topographic map – Fredericksburg Quadrangle – DEQ #182C (Attachment 2).

See Attachment 2 for a facility schematic/diagram.

TABLE 1 – Outfall Description

Outfall Number	Discharge Sources	Treatment	Design Flow	Outfall Latitude and Longitude
001	Domestic and/or Commercial	See Item 10 above.	4 MGD	38° 15' 22" N 77° 24' 45" W

**11. Sludge Treatment and Disposal Methods:**

Sludge is aerobically digested and dewatered with centrifuges. The facility produces a Class B sludge. Final disposal of the sludge shall be land application using Synagro Mid-Atlantic. Previously, sludge was hauled to the Rappahannock Regional Landfill in Stafford County.

**12. Discharges, Intakes, Monitoring Stations, Other Items in Vicinity of Discharge**

Table 2 – Other Discharges in the Vicinity of Little Falls Run WWTP

<b>Rappahannock River Mile (approximate)</b>	<b>Description</b>
113.57	<b>USGS Gaging Station</b> (Fredericksburg)
107.87	<b>Discharge</b> - City of Fredericksburg WWTF, VPDES Permit VA0025127, Major-Municipal
107.37	<b>Discharge</b> - FMC WWTP, VPDES Permit VA0068110, Major-Municipal
107.49	<b>Tributary with Discharge</b> - Deep Run. Quarles Petroleum - Fredericksburg Bulk Oil Terminal, VPDES Permit VA0029785, Minor-Industrial.
106.09	<b>Industrial Water Supply</b> - GM Power Train Group intake
104.67	<b>Discharge</b> - Massaponax STP, VPDES Permit VA0025658, Major-Municipal
104.61	<b>Discharge</b> - Little Falls Run STP, VPDES Permit VA0076392, Major-Municipal
104.47	<b>DEQ Sampling Station</b> - 3RPP104.47.
	<b>Discharge</b> – Fredericksburg Concrete, VPDES Permit VAG110098, Ready-Mixed Concrete General Permit
	<b>Discharge</b> – Culpeper Wood Preservers – Ruffins Creek, VPDES Permit VA0090468, Minor - Industrial
	<b>Discharge</b> – Titan – New Post Ready Mix. VPDES Permit VAG110106, Ready-Mixed Concrete General Permit
	<b>Tributary with Discharge</b> - Massaponax Creek. Luck Stone - Spotsylvania. VPDES Permit VAG840104, NonMetallic Mineral Mining General Permit
96.5	<b>Industrial Water Supply</b> - VA0087645, SEI Birchwood, Minor-Industrial, 6.6 MGD Maximum intake
96.39	<b>Discharge</b> - VA0087645, SEI Birchwood, Minor-Industrial, 0.5 MGD Maximum <b>Discharge</b> – VA0090654 Greenhost Farms, Minor-Industrial, 1.0 MGD Maximum
91.94	<b>Tributary with Discharge</b> - Skinker's Creek. Receiving stream for VA0060429, Four Winds Campground, Minor- Municipal.
91.6	<b>Tributary with Discharge</b> - Birchwood Creek. UT, Birchwood Creek. Royster Clark Inc - Sealston . VA0088374, Minor, Industrial
89.8	<b>Discharge</b> - Hopyard Farm Wastewater Treatment Plant, VPDES Permit VA0089338, Minor-Municipal
85.10	<b>Discharge</b> (proposed) - Haymount WWTF, VPDES Permit VA0089125, Municipal-Minor.
80.19	<b>U.S. Route 301 Bridge at Port Royal</b>

Table 3 – VPDES Industrial Stormwater GP Discharges in the Vicinity of Little Falls Run WWTP

<b>VPDES Number</b>	<b>Facility Name</b>
VAR051809	<b>Discharge to Rappahannock River</b> - City of Fredericksburg STP
VAR051423	<b>Discharge to Rappahannock River</b> - FMC WWTP
VAR051422	<b>Discharge to Rappahannock River</b> – Massaponax STP
VAR051420	<b>Discharge to Rappahannock River</b> – Little Falls Run WWTP
VAR051028	<b>Discharge to Rappahannock River, UT</b> – McLane Mid Atlantic
VAR051012	<b>Discharge to Rappahannock River, UT</b> – Virginia Paving Company – Fredericksburg Plant
VAR051052	<b>Discharge to Rappahannock River, UT</b> – United Parcel Service - Fredericksburg
VAR051090	<b>Discharge to Rappahannock River, UT</b> – GM LLC
VAR051091	<b>Discharge to Rappahannock River, UT</b> – Anderson Oil Company – Bulk Storage Terminal
VAR051110	<b>Discharge to Rappahannock River, UT</b> – Federal Express Corporation – DGNA Station

**13. Material Storage:**

TABLE 4 - Material Storage		
Materials Description	Volume Stored	Spill Prevention Measures
Alum	4000 gallons (maximum)	Spills go to the drainage pump station
Polymer	3000 pounds	Spills go to the truck dump station
Hydrated Lime	20 tons	N/A
Diesel Fuel	250 gallons	Spills go to the truck dump station

**Site Inspection:**

- 14.** The last full technical inspection was performed by DEQ-Water Compliance in December 2008. See Attachment 3.

DEQ permitting staff performed a site inspection on April 2, 2010. At the time of the inspection, only one Schreiber train was in use. The other unit was out of service so the blowers could be replaced as part of the facility upgrade. Once the work is done on that unit, it will be placed back in service so the blowers in the other train can be upgraded. Construction was also underway for the additional UV and digester units.

**15. Receiving Stream Water Quality and Water Quality Standards:**a) Ambient Water Quality Data

The Little Falls Run WWTP discharges to the Rappahannock River at segment VAN-E20E\_RPP02A02. Segment VAN-E20E\_RPP02A02 extends from the confluence with Deep Run downstream to the confluence with Massaponax Creek. The nearest downstream monitoring station is 3-RPP104.47, which is located approximately 0.06 miles downstream from the Outfall of this facility. This segment of the Rappahannock River is part of the Chesapeake Bay Program's Rappahannock Tidal Fresh (RPPTF) segment. The RPPTF extends from the fall line at the Route 1 Bridge Crossing, downstream until river mile 57.85.

Sufficient excursions from the instantaneous *E. coli* bacteria criterion (6 of 23 samples - 26.1%) were recorded at DEQ's ambient water quality monitoring station (3-RPP104.47), one hundred yards below the Massaponax Wastewater Treatment Facility, to assess this stream segment as not supporting of the recreation use goal for the 2008 water quality assessment. The segment was previously listed for a fecal coliform bacteria impairment, from 2002 through 2004. The *E. coli* bacteria impairment was first listed in 2006.

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. The advisory, dated 12/13/04, limits American eel, blue catfish, carp, channel catfish, croaker, gizzard shad, and anadromous (coastal) striped bass consumption to no more than two meals per month. The affected area extends from the I-95 Bridge above Fredericksburg downstream to the mouth of the river near Stingray Point, including its tributaries Hazel Run up to the I-95 bridge crossing and Claiborne Run up to the Route 1 bridge crossing. Excursions above the water quality criterion based tissue value (TV) of 54 parts per billion (ppb) for polychlorinated biphenyls (PCBs) in fish tissue were recorded in four species of fish (6 total samples) collected in 2001 and 2006 at monitoring station 3-RPP107.33 (carp, channel catfish, gizzard shad, striped bass). As a result, the waters were assessed as not supporting of the CWA's fish consumption use goal.

An open water assessment of dissolved oxygen values during the summer season showed that the RPPTF was not supporting. The RPPTF was 0.999 percent above CFD. The segment is considered impaired for the aquatic life use.

See Attachment 4 for the full planning statement.

Significant portions of the Chesapeake Bay and its tributaries are listed as impaired on Virginia's 303(d) list of impaired waters for not meeting the aquatic life use support goal, and the 2008 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report indicates that much of the mainstem Bay does not fully support this use support goal under Virginia's Water Quality Assessment guidelines. Nutrient enrichment is cited as one of the primary causes of impairment.

In response, the Virginia General Assembly amended the State Water Control Law in 2005 to include provisions addressing nutrient loadings to the Chesapeake Bay. This statute set forth total nitrogen and total phosphorus discharge restrictions within the bay watershed. Concurrently, the State Water Control Board adopted new water quality criteria for the Chesapeake Bay and its tidal tributaries. These actions necessitate the evaluation and the inclusion of nitrogen and phosphorus limits on discharges within the bay watershed.

b) Receiving Stream Water Quality Criteria

Part IX of 9VAC25-260(360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream Rappahannock River is located within Section 1 of the Rappahannock River Basin, and classified as a Class II water.

Class II tidal waters in the Chesapeake Bay and its tidal tributaries must meet dissolved oxygen concentrations as specified in 9VAC25-260-185 and maintain a pH of 6.0-9.0 standard units as specified in 9VAC25-260-50. In the upper tidal freshwater Rappahannock River area, Class II waters must meet the Migratory Fish Spawning and Nursery Designated Use from February 1 through May 31. For the remainder of the year, these tidal waters must meet the Open Water use. The applicable dissolved oxygen concentrations are presented below.

Table 5 - Dissolved Oxygen Criteria (9 VAC 25-260-185)

Designated Use	Criteria Concentration/Duration	Temporal Application
Migratory fish spawning and nursery	7-day mean > 6 mg/L (tidal habitats with 0-0.5 ppt salinity)	February 1 – May 31
	Instantaneous minimum > 5 mg/L	
Open-water <sup>1,2</sup>	30-day mean > 5.5 mg/L (tidal habitats with 0-0.5 ppt salinity)	Year-round
	30-day mean > 5 mg/L (tidal habitats with >0.5 ppt salinity)	
	7-day mean > 4 mg/L	
	Instantaneous minimum > 3.2 mg/L at temperatures < 29°C	
Deep-water	Instantaneous minimum > 4.3 mg/L at temperatures > 29°C	June 1-September 30
	30-day mean > 3 mg/L	
	1-day mean > 2.3 mg/L	
Deep-channel	Instantaneous minimum > 1.7 mg/L	June 1-September 30
	Instantaneous minimum > 1 mg/L	

<sup>1</sup>See subsection aa of 9 VAC 25-260-310 for site specific seasonal open-water dissolved oxygen criteria applicable to the tidal Mattaponi and Pamunkey Rivers and their tidal tributaries.

<sup>2</sup>In applying this open-water instantaneous criterion to the Chesapeake Bay and its tidal tributaries where the existing water quality for dissolved oxygen exceeds an instantaneous minimum of 3.2 mg/L, that higher water quality for dissolved oxygen shall be provided antidegradation protection in accordance with section 30 subsection A.2 of the Water Quality Standards.

This discharge segment of the Rappahannock is located in the tidal freshwater zone. This zone extends from the fall line of the Rappahannock River to Buoy 37 near Tappahannock. Freshwater, numerical water quality criteria, as opposed to saltwater criteria (excluding dissolved oxygen, pH, temperature, and chlorine), apply to this tidal freshwater zone.

Attachment 5 details other water quality criteria applicable to the receiving stream.

#### Ammonia:

The Water Quality Criteria for Ammonia are dependent on the instream temperature and pH. The 90th percentile temperature and pH values are used because they best represent the critical design conditions of the receiving stream. The 90th percentile pH and temperature values were previously derived from weekly samples collected by the City of Fredericksburg Department of Public Works staff at the Mayfield Bypass Bridge during the period of January 1991 through May 1995. This station is located upstream of the outfalls for the City of Fredericksburg Wastewater Treatment Plant, FMC Sewage Treatment Plant, Massaponax Sewage Treatment Plant and Little Falls Run Wastewater Treatment Plant. There is now a DEQ Ambient Monitoring Station, 3-RPP104.47, located 100 yards below the Massaponax WWTF outfall from which current data was reviewed. Staff has evaluated the receiving stream ambient monitoring data for pH and temperature during the period of February 21, 1991 to April 8, 2008 from the ambient station and finds no significant differences from the data used to establish ammonia criteria during the previous permit using the City's data. Therefore, the previously established 90th percentile values will be carried forward as part of this reissuance process. The 90th percentile pH and temperature values were found to be 7.5 S.U. and 27.5°C. See Attachment 5 for the acute and chronic ammonia water quality criteria calculations. See Attachment 5 for the pH and Temperature data.

The seasonal tiers for the Rappahannock River are November through April and May through October as determined by the Virginia Institute for Marine Science, entitled A Modeling Study of the Water Quality of the Upper Rappahannock River (VIMS model). These tiers reflect the division between the winter and summer periods relative to temperature in the Rappahannock River. In addition, these tiers are consistent with seasonal tiers for other Rappahannock River dischargers in the Fredericksburg area.

#### Metals Criteria:

The Water Quality Criteria for some metals are dependent on the receiving stream's hardness (expressed as mg/l calcium carbonate).

During the 1999 reissuance, monitoring and limits for zinc were placed in the Little Falls Run permit based on the monitoring data and calculated wasteload allocations for zinc. The hardness used for these limits was based on DEQ ambient monitoring data; the average downstream hardness was 29.5 mg/L.

In November 2001, DEQ modified the Little Falls Run WWTP permit to remove the monitoring and effluent limits for zinc. This modification was prompted by changes made to the FMC (VA0068110) and City of Fredericksburg (VA0025127) VPDES permits in August 2001. DEQ staff determined that the ambient hardness data did not reflect what the instream hardness would be under design conditions, i.e., drought flows and all STPs at design flow. It was also felt that there is uncertainty in the mixing zones; therefore, determining an accurate mass balance between the STPs and the background river hardness would not be feasible. As recommended in DEQ guidance, a default value of 50 mg/L was used to calculate the metals criteria. This changed the wasteload allocations for the four major dischargers in the upper tidal portion of the Rappahannock River.

Attachment 7 contains the 2001 memorandums summarizing staff's best professional judgment decisions and the statistical evaluations on the removal of the zinc monitoring and limitations. The hardness-dependent criteria in Attachment 4 are based on a total hardness value of 50 mg/L.

Bacteria Criteria: The Virginia Water Quality Standards (9VAC25-260-170 A.) states that the following criteria shall apply to protect primary recreational uses in surface waters:

- 1) *E. coli* and enterococci bacteria per 100 ml of water shall not exceed a monthly geometric mean of the following:

	Geometric Mean <sup>1</sup>
Freshwater <i>E. coli</i> (N/100 ml)	126
Saltwater[and Transition Zone <sup>2</sup> ] enterococci	35

<sup>1</sup>For a minimum of four weekly samples.

<sup>2</sup>See 9VAC25-260-140 C for fresh[water] and transition zone delineation

c) Receiving Stream Special Standards

The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes, and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, Rappahannock River, is located within Section 1 of the Rappahannock Basin. This section has been designated with a special standard of a. Note: The NEW-15 designation has been repealed in the Water Quality Standards.

The receiving stream has been designated with a special standard of "a." According to 9VAC25-260-310.a, Special Standard a applies to all open ocean or estuarine waters capable of propagating shellfish or in specific areas where public or leased private shellfish beds are present, including those waters on which condemnation or restriction classifications are established by the State Department of Health. The fecal coliform bacteria standard is as follows: the geometric mean fecal coliform value for a sampling station shall not exceed an MPN (Most probable number) of 14 per 100 milliliters of sample and the 90<sup>th</sup> percentile shall not exceed 43 for a 5-tube, 3-dilution or 49 for a 3-tube, 3-dilution test. The shellfish are is not to be so contaminated by radionuclides, pesticides, herbicides, or fecal material that the consumption of shellfish might be hazardous. This same standard is also contained in 9 VAC 25-260-160 Fecal Coliform Bacteria; Shellfish Waters. This standard is used for the interpretation of instream monitoring data and not for setting fecal coliform effluent limitations.

d) Threatened or Endangered Species

The Virginia DGIF Fish and Wildlife Information System Database was searched on February 1, 2010, for records to determine if there are threatened or endangered species in the vicinity of the discharge. According to the database search and an e-mail from the Virginia Department of Game and Inland Fisheries on February 24, 2010, the dwarf wedge mussel and the green floater, also a freshwater mussel, are known in the project area. The database did not have either species confirmed by collection. The limits proposed in this draft permit are protective of the current Virginia Water Quality Standards and therefore, protect the threatened and endangered species found near the discharge. A copy of the database search was placed in the reissuance file.

The stream that the facility discharges to is within a reach identified as having an Anadromous Fish Use. It is staff's best professional judgment that the proposed limits are protective of this use.

See Section 27 of the Fact Sheet for the comments received from the Virginia Department of Game and Inland Fisheries and staff's response to the comments.

e) Virginia Institute of Marine Science Rappahannock River Model

Stafford County, Spotsylvania County and the City of Fredericksburg sponsored a water quality model for the upper Rappahannock River estuary developed by the Virginia Institute for Marine Science, entitled A Modeling Study of the Water Quality of the Upper Rappahannock River (VIMS model). This model was approved by the State Water Control Board Director on December 6, 1991, and has been used to determine effluent limitations

for new and expanded discharges in the upper Rappahannock River since then. The model was initially run on the following dates: August 14, 1995, for the issuance of the Haymount permit and the flow expansion at the Fredericksburg STP; August 22, 1996, for the issuance of the Hopyard permit; and March 17, 1997, for changes in flow and production at White Packing. It was run again on April 7, 1999, to accommodate flow expansions at the Little Falls Run WWTP and the Massaponax WWTP. Staff ran the VIMS model in April 2003 for the expansion of the proposed Hopyard WWTP to 0.5 MGD.

Based on the previous runs of Virginia Institute for Marine Science model entitled *A Modeling Study of the Water Quality of the Upper Tidal Rappahannock River*, the chlorophyll a levels in the upper segment of the River in the Fredericksburg area were approaching 100 µg/l. Chlorophyll a serves as an indicator for eutrophication and phosphorus contributes directly to its growth. The limits in the current permit are set to prevent further increases in chlorophyll a concentrations in this segment of the river. Whether or not nutrient limitations are needed for the Bay, the total phosphorus loadings (mass, kg/d) will not be allowed to increase for the City of Fredericksburg, FMC, Massaponax, and Little Falls Run wastewater treatment plants beyond current limits.

With the 2005 reissuance, Stafford County asked for an additional flow tier of 13.0-MGD in the Little Falls Run VPDES permit. Staff used the VIMS model to evaluate what impact this increased flow would have on the Upper Rappahannock River. The modeling done in 2005 did not result in any changes to the limits proposed in the permit.

In 2009, Spotsylvania County requested that 1.4 MGD flow from the FMC facility be transferred to the Massaponax STP permit. This request created an additional flow tier of 9.4 MGD in the Massaponax permit, but the FMC STP would not be expanded beyond its current design flow of 4.0 MGD. Staff used the VIMS model to evaluate any potential impact to the River. This minor change also did not require any effluent limits to be changed according to the model. The 2009-2010 modeling summary is found in Attachment 8.

#### **16. Antidegradation (9VAC25-260-30):**

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

During the last permit reissuance for this discharge, an antidegradation analysis was done since it involved a flow increase from 8.0-MGD to 13.0-MGD for which plans and specifications had not been approved. The additional review requirements for expanded discharges are not applicable to the 4.0 and 8.0 MGD design flows, and effluent limitations which comply with the Water Quality Standards for Surface Water will also comply with the State Water Control Board's antidegradation policy. However, an antidegradation evaluation had to be performed for the increased flow to 13.0 MGD. The antidegradation review began with a Tier determination. Staff determined that the receiving stream is Tier I for the following reasons:

1. Antidegradation was not used in developing limits for the previous permit actions.
2. The current run of the VIMS Model for the Rappahannock River indicates that the dissolved oxygen for migratory fish waters will not greatly exceed the 6.0 mg/L criteria.
3. This Tier I determination is in keeping with Tier determinations of other nearby dischargers, including Fredericksburg STP, Massaponax STP, and FMC STP.
4. The segment from the fall line at Route 1 to the confluence of Mill Creek with the Rappahannock River is listed in the 2008 IR, due to the fact that it does not support the Recreation Use (*E. coli*) or the Fish Consumption (PCBs in Fish Tissue) Use.
5. The 2008 IR lists a portion of the Rappahannock River as not supporting the Aquatic Life use due to dissolved oxygen, and nutrient/eutrophication biological indicators.

6. The chlorophyll a concentrations in the receiving water have historically been high.
7. Turbidity measurements from ambient monitoring indicated high turbidity.

For Tier 1 waters, antidegradation is addressed by ensuring that the effluent limits result in compliance with the water quality standards.

#### **17. Effluent Screening, Wasteload Allocation, and Effluent Limitation Development :**

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points is equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLAs) are calculated. The WLA values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. Effluent limitations are the calculated on the most limiting WLA, the required sampling frequency, and statistical characteristics of the effluent data.

a) Effluent Screening:

Effluent data obtained from the permit application and Discharge Monitoring Reports (DMRs) from the past three years has been reviewed and determined to be suitable for evaluation. Effluent data were reviewed, and there have been no exceedances of the established limitations.

The following pollutants require a wasteload allocation analysis: Ammonia as Nitrogen since this is a sewage treatment plant treating domestic sewage, copper since it was detected in the effluent and zinc since it was also detected in the effluent.

b) Wasteload Allocation Determination:

There has not been a site specific determination for the tidal dilution for the Little Falls Run discharge. Since this is the case, staff used best professional judgment in determining the appropriate WLAs for metals, organics and ammonia as N.

A flow determination was completed utilizing Rappahannock River flows at the fall line and a drainage area comparison (Attachment 1). Agency software MIX.exe was then used to determine the appropriate mix assumptions; the calculations can be found in Attachment 1 with the flow determination. The Water Quality Standards use different critical flows to determine the wasteload allocations for toxics. The WLA determinations for this reissuance are presented below.

#### **WLA calculation for Metals and Organics**

During the 1999 reissuance, staff utilized the following method to determine the wasteload allocation for zinc:

Acute Toxicity - DEQ-Guidance Memorandum 93-015 states that for surface discharges into tidal estuaries or estuarine embayments, the acute wasteload allocation WLAA should be set at 2 times the acute standard because initial mixing in these circumstances is limited and lethality in the allocated impact zone must be prevented. The 2X factor is derived from the fact that the acute standard (or Criteria Maximum Concentration - CMC) is defined as one half of the final acute value (FAV) for a specific toxic pollutant. The term final acute value is defined as an estimate of the concentration of the toxicant corresponding to a cumulative probability of 0.05 for the acute toxicity values for all genera for which acceptable acute test have been conducted with the toxicant. Therefore, if the acute value is one half the FAV, then 2 times the acute standard should equal the FAV or equal an acceptable value for preventing lethality.

Chronic Toxicity - DEQ-Guidance Memorandum 93-015 states that for surface discharges into tidal estuaries, estuarine embayments, or the open ocean, the WLAc should be based upon site specific data on waster dispersion or dilution when available and appropriate. Where wastewater dispersion/dilution data are not available, a dilution ration of 50:1 may be used. While staff acknowledges that some dilution is occurring in the river, it is not appropriate to use the 50:1 dilution ratio. There are three other municipal discharges in the area which greatly influence the mixing zone, and the LFR discharge is close to the fall line, thus large tidal influences may not be realized. Recognizing that 50:1 is too high, and no dilution is too stringent (end of pipe) because some mixing is occurring, staff has chosen to use an in-stream waste concentration of 50% until more evidence becomes available which demonstrates a more appropriate dilution ratio.

Further justification for not using the 50:1 dilution ratio and using the 2X factor is found by calculating the cumulative Instream Waste Concentration (IWC%) of all four Upper Rappahannock Dischargers (Little Falls Run-13 MGD, Massaponnax-9.4 MGD, Fredericksburg-4.5 MGD, FMC-4 MGD). The flows from all facilities are critical since they all impact the available mixing zone.

$$\begin{aligned} \text{IWC} &= \frac{Q_e}{Q_e + Q_s} = \frac{13 \text{ MGD} + 9.4 \text{ MGD} + 4.5 \text{ MGD} + 4 \text{ MGD}}{(13 \text{ MGD} + 9.4 \text{ MGD} + 4.5 \text{ MGD} + 4 \text{ MGD}) + 31 \text{ MGD}} \\ &= 0.499 \sim 50\% \end{aligned}$$

Where:  $Q_e$  = the combined flows of all four dischargers.  
 $Q_s$  = the 7Q10 of the receiving river at the fall line.

An IWC of 50% would have a similar effect on wasteload allocations as a dilution factor of 1:2. The WLA calculations in Attachment 5 are determined using this dilution factor.

#### **WLA calculation for Ammonia as N**

For this 2010 reissuance of the Little Falls Run WWTP permit, staff will use a similar approach to determine the acute and chronic wasteload allocations (WLAs) for ammonia. While metals utilize the 7Q10 to determine the chronic WLA, 30-day chronic ammonia as N utilizes the 30Q10. Again, all the flows from all the facilities are critical.

$$\begin{aligned} \text{IWC} &= \frac{Q_e}{Q_e + Q_s} = \frac{13 \text{ MGD} + 9.4 \text{ MGD} + 4.5 \text{ MGD} + 4 \text{ MGD}}{(13 \text{ MGD} + 9.4 \text{ MGD} + 4.5 \text{ MGD} + 4 \text{ MGD}) + 52 \text{ MGD}} \\ &= 0.37 \sim 40\% \end{aligned}$$

Where:  $Q_e$  = the combined flows of all four dischargers.  
 $Q_s$  = the 30Q10 of the receiving river at the fall line.

An IWC of 40% would have a similar effect on wasteload allocations as a dilution factor of 2:5. The WLA ammonia calculations in Attachment 5 are determined using this dilution factor.

#### c) Effluent Limitations Toxic Pollutants, Outfall 001 –

9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation at 9VAC25-31-230.D. requires that monthly and weekly average limitations be imposed for continuous discharges from POTWs and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

##### 1) TKN:

A review of the output data of the VIMS model indicates that there will be no near field or far field violations of the ammonia and dissolved oxygen standards. Far field ammonia concentrations are

compared to the chronic ammonia standard of 1.89 mg/L. The model indicates that the existing TKN limit of 6.0 mg/l in the summer is sufficient to protect against chronic toxicity, and no specific TKN limits are needed in the winter.

Based on the VIMS model run predictions and the upcoming Total Nitrogen annual loading limitations that Little Falls Run and the other significant dischargers in the Upper Rappahannock River will have to achieve, staff has concluded that no changes are necessary to the TKN limitations in the permit at any of the four flow tiers. Existing TKN May-October limitations are proposed to continue in the reissued permit to protect the dissolved oxygen standard.

2) Ammonia as N:

Utilizing the above WLA methodology, staff determined the yearly Ammonia as N acute WLA to be 25 mg/L and 4.7 mg/L for the chronic. The WLAs were evaluated and the output is found in Attachment 6 with the pH and temperature data. DEQ guidance suggests using a sole data point of 9.0 mg/L for discharges containing domestic sewage to ensure the evaluation adequately addresses the potential for ammonia to be present in the discharge containing domestic sewage. This reissuance proposes a monthly average of 4.7 mg/L and a weekly average of 5.6 mg/L for ammonia as N.

3) Metals/Organics:

Current effluent monitoring from the application noted that copper (1.7 ug/L) and zinc (41 ug/L) were detected in the effluent. These values are both less than the site specific target values; therefore, there is no reasonable potential for the effluent to violate the applicable water quality criteria, and no limits are needed.

d) Effluent Limitations and Monitoring, Outfall 001 – Conventional and Non-Conventional Pollutants

No changes to dissolved oxygen (D.O.), carbonaceous biochemical oxygen demand-5 day (CBOD<sub>5</sub>), total suspended solids (TSS), Total Kjeldahl Nitrogen (TKN), and pH limitations are proposed.

Monthly average concentration and loading for Total Phosphorus, Dissolved Oxygen, TKN (May-October), and CBOD<sub>5</sub> limitations are based on the VIMS model and are set to meet the water quality criteria for D.O. in the receiving stream. With the 2005 reissuance, Stafford County asked for an additional flow tier of 13.0-MGD in the Little Falls Run VPDES permit. Staff used the VIMS model to evaluate what impact this increased flow would have on the Upper Rappahannock River. The modeling results did not warrant any changes to the above limits at the expanded flow tier.

Since the facility is upgrading to meet a Total Phosphorus annual average of 0.30 mg/L at 6.0 MGD, it is staff's best professional opinion that the monthly average concentration and loading limitations are not necessary once the facility expands beyond the current design flow of 4.0 MGD. Staff did leave the monitoring in place with no limitation.

It is staff's practice to equate the Total Suspended Solids limits with the BOD<sub>5</sub>/CBOD<sub>5</sub> limits. TSS limits are established to equal BOD<sub>5</sub> limits since the two pollutants are closely related in terms of treatment of domestic sewage.

pH limitations are set at the water quality criteria.

*E. coli* limitations are in accordance with the Water Quality Standards 9VAC25-260-170.

e) Effluent Annual Average Limitations and Monitoring, Outfall 001 – Nutrients

VPDES Regulation 9VAC25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

As discussed in Section 15, significant portions of the Chesapeake Bay and its tributaries are listed as impaired with nutrient enrichment cited as one of the primary causes. Virginia has committed to protecting

and restoring the Bay and its tributaries. There are three regulations that necessitate the inclusion of nutrient limitations:

- 9VAC25-40 - *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed* requires new or expanding discharges with design flows of  $\geq 0.04$  mgd to treat for TN and TP to either BNR levels (TN = 8 mg/l; TP = 1.0 mg/l) or SOA levels (TN = 3.0 mg/l and TP = 0.3 mg/l).
- 9VAC25-720 – *Water Quality Management Plan Regulation* sets forth TN and TP maximum wasteload allocations for facilities designated as significant discharges, i.e., those with design flows of  $\geq 0.5$  mgd above the fall line and  $\geq 0.1$  mgd below the fall line. This regulation limits the total nitrogen and total phosphorus mass loadings from these discharges.
- 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia* became effective January 1, 2007. This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited, and otherwise regulated under the general permit and not this individual permit. This facility has coverage under this General Permit; the permit number is VAN020031.

Monitoring for Nitrates + Nitrites, Total Kjeldahl Nitrogen, Total Nitrogen, and Total Phosphorus are included in this permit. The monitoring is needed to protect the Water Quality Standards of the Chesapeake Bay. Monitoring frequencies are set at the frequencies set forth in 9VAC25-820.

Annual average effluent limitations, as well as monthly and year to date calculations, for Total Nitrogen and Total Phosphorus are included in this individual permit.

At the 4.0 MGD flow tier, an 8.0 mg/L Annual Average Total Nitrogen and a 1.0 mg/L Annual Average Total Phosphorus are proposed. These concentrations are based on the current technology installed.

At the 8.0 – Phase I MGD flow tier, a 6.0 mg/L Annual Average Total Nitrogen and a 0.30 mg/L Annual Average Total Phosphorus are proposed. These concentrations are based on the re-rating calculations provided by Stafford County's consultant. The WQIF Grant Agreement (Stafford County Little Falls Run WWTF-Phase I Grant: #440-S-09-18) will be amended to reflect these concentrations.

At the 8.0 – Phase II MGD flow tier, a 4.0 mg/L Annual Average Total Nitrogen and a 0.30 mg/L Annual Average Total Phosphorus are proposed. These concentrations are based on the values used to derive the WLA contained in 9VAC25-720 – *Water Quality Management Plan Regulation*.

At the 13.0 MGD flow tier, a 3.0 mg/L Annual Average Total Nitrogen and a 0.30 mg/L Annual Average Total Phosphorus are proposed. These concentrations are based on 9VAC25-40 - *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed* that requires expanding discharges to treat to State-of-the-Art levels (TN = 3.0 mg/l and TP = 0.3 mg/l).

f) Effluent Limitations and Monitoring Summary.

The effluent limitations are presented in the following table. Limits were established for Flow, CBOD<sub>5</sub>, Total Suspended Solids, Ammonia as N, pH, Dissolved Oxygen, Total Kjeldahl Nitrogen (TKN), annual average Total Nitrogen, annual average Total Phosphorus, monthly Total Phosphorus concentration and loading, and *E. coli*.

The limit for Total Suspended Solids is based on Best Professional Judgement.

The mass loading (kg/d) for monthly and weekly averages were calculated by multiplying the concentration values (mg/l), with the flow values (in MGD) and a conversion factor of 3.785.

The mass loading (lb/d) for TKN/Total Phosphorus monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and a conversion factor of 8.3438.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual.

The VPDES Permit Regulation at 9VAC25-31-30 and 40 CFR Part 133 require that the facility achieve at least 85% removal for BOD/CBOD and TSS (or 65% for equivalent to secondary). The limits in this permit are water-quality-based effluent limits and result in greater than 85% removal.

**18. Antibacksliding:**

All limits in this permit are at least as stringent as those previously established. Backsliding does not apply to this reissuance.

**19. Effluent Limitations/Monitoring Requirements:**

Design flow is 4.0 MGD.

Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date or the CTO for the 8.0 or 13.0 MGD flow tiers, whichever comes first.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
CBOD <sub>5</sub>	3,5	9 mg/L 140 kg/day	14 mg/L 210 kg/day	NA	NA	1/D	24H-C
Total Suspended Solids (TSS)	2	9.0 mg/L 140 kg/day	14 mg/L 210 kg/day	NA	NA	1/D	24H-C
TKN (mg/L) (May through October)	3,5	6.0 mg/L 200 lb/day	9.0 mg/L 300 lb/day	NA	NA	1/W	24H-C
TKN (mg/L) (November through April)	3	NL	NL	NA	NA	1/W	24H-C
Ammonia as N	3	4.7 mg/L	5.6 mg/L	NA	NA	1/D	24H-C
Dissolved Oxygen	3, 5	NA	NA	6.0 mg/L	NA	1/D	Grab
<i>E. coli</i> (Geometric Mean)	3	126 n/100mls	NA	NA	NA	1/D	Grab
Nitrate+Nitrite, as N	3, 6	NL mg/L	NA	NA	NA	1/W	24H-C
Total Nitrogen <sup>a</sup>	3, 6	NL mg/L	NA	NA	NA	1/W	Calculated
Total Nitrogen – Year to Date <sup>b</sup>	3, 6	NL mg/L	NA	NA	NA	1/M	Calculated
Total Nitrogen - Calendar Year <sup>b</sup>	3, 6	8.0 mg/L	NA	NA	NA	1/YR	Calculated
Total Phosphorus	3, 5	2.0 mg/L 67 lb/day	NA	NA	NA	1/W	24H-C
Total Phosphorus – Year to Date <sup>b</sup>	3, 6	NL mg/L	NA	NA	NA	1/M	Calculated
Total Phosphorus - Calendar Year <sup>b</sup>	3, 6	1.0 mg/L	NA	NA	NA	1/YR	Calculated
Chronic Toxicity – <i>C. dubia</i> (TU <sub>c</sub> )		NA	NA	NA	NL	1/YR	24H-C
Chronic Toxicity – <i>P. promelas</i> (TU <sub>c</sub> )		NA	NA	NA	NL	1/YR	24H-C

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgment
3. Water Quality Standards
4. DEQ Disinfection Guidance
5. VIMS Stream Model
6. 9VAC25-40 (Nutrient Regulation)

MGD = Million gallons per day.

NA = Not applicable.

NL = No limit; monitor and report.

S.U. = Standard units.

TIRE = Totalizing, indicating and recording equipment.

1/D = Once every day.

1/W = Once every week.

1/M = Once every month.

1/YR = Once every year.

**24H-C** = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the Monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by  $\geq 10\%$  or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

a. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite

b. See Section 20.a. for the calculation of the Nutrient Calculations.

**19. Effluent Limitations/Monitoring Requirements:**

Design flow is 8.0 MGD – Phase I.

Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date or the CTO for the 8.0 – Phase II or 13.0 MGD flow tiers, whichever comes first.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS			
		Monthly Average		Weekly Average		Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL		NA		NA	NL	Continuous	TIRE
pH	3	NA		NA		6.0 S.U.	9.0 S.U.	1/D	Grab
CBOD <sub>5</sub>	3,5	9 mg/L	270 kg/day	14 mg/L	420 kg/day	NA	NA	1/D	24H-C
Total Suspended Solids (TSS)	2	9.0 mg/L	270 kg/day	14 mg/L	420 kg/day	NA	NA	1/D	24H-C
TKN (mg/L) (May through October)	3,5	6.0 mg/L	400 lb/day	9.0 mg/L	600 lb/day	NA	NA	1/W	24H-C
TKN (mg/L) (November through April)	3	NL		NL		NA	NA	1/W	24H-C
Ammonia as N	3	4.7 mg/L		5.6 mg/L		NA	NA	1/D	24H-C
Dissolved Oxygen	3, 5	NA		NA		6.0 mg/L	NA	1/D	Grab
<i>E. coli</i> (Geometric Mean)	3	126 n/100mls		NA		NA	NA	1/D	Grab
Nitrate+Nitrite, as N	3, 6	NL mg/L		NA		NA	NA	1/W	24H-C
Total Nitrogen <sup>a</sup> .	3, 6	NL mg/L		NA		NA	NA	1/W	Calculated
Total Nitrogen – Year to Date <sup>b</sup> .	3, 6	NL mg/L		NA		NA	NA	1/M	Calculated
Total Nitrogen - Calendar Year <sup>b</sup> .	3, 6	6.0 mg/L		NA		NA	NA	1/YR	Calculated
Total Phosphorus	3, 5	NL mg/L		NA		NA	NA	1/W	24H-C
Total Phosphorus – Year to Date <sup>b</sup> .	3, 6	NL mg/L		NA		NA	NA	1/M	Calculated
Total Phosphorus - Calendar Year <sup>b</sup> .	3, 6	0.30 mg/L		NA		NA	NA	1/YR	Calculated
Chronic Toxicity – <i>C. dubia</i> (TU <sub>c</sub> )		NA		NA		NA	NL	1/3M	24H-C
Chronic Toxicity – <i>P. promelas</i> (TU <sub>c</sub> )		NA		NA		NA	NL	1/3M	24H-C

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgment
3. Water Quality Standards
4. DEQ Disinfection Guidance
5. VIMS Stream Model
6. 9VAC25-40 (Nutrient Regulation)

MGD = Million gallons per day.

NA = Not applicable.

NL = No limit; monitor and report.

S.U. = Standard units.

TIRE = Totalizing, indicating and recording equipment.

1/D = Once every day.

1/W = Once every week.

1/M = Once every month.

1/YR = Once every year.

1/3M = Once every three months.

24H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the Monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by  $\geq 10\%$  or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

a. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite

b. See Section 20.a. for the calculation of the Nutrient Calculations.

**19. Effluent Limitations/Monitoring Requirements:**

Design flow is 8.0 MGD – Phase II.

Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date or the CTO for the 13.0 MGD flow tier, whichever comes first.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
CBOD <sub>5</sub>	3,5	9 mg/L 270 kg/day	14 mg/L 420 kg/day	NA	NA	1/D	24H-C
Total Suspended Solids (TSS)	2	9.0 mg/L 270 kg/day	14 mg/L 420 kg/day	NA	NA	1/D	24H-C
TKN (mg/L) (May through October)	3,5	6.0 mg/L 400 lb/day	9.0 mg/L 600 lb/day	NA	NA	1/W	24H-C
TKN (mg/L) (November through April)	3	NL	NL	NA	NA	1/W	24H-C
Ammonia as N	3	4.7 mg/L	5.6 mg/L	NA	NA	1/D	24H-C
Dissolved Oxygen	3, 5	NA	NA	6.0 mg/L	NA	1/D	Grab
<i>E. coli</i> (Geometric Mean)	3	126 n/100mls	NA	NA	NA	1/D	Grab
Nitrate+Nitrite, as N	3, 6	NL mg/L	NA	NA	NA	1/W	24H-C
Total Nitrogen <sup>a</sup>	3, 6	NL mg/L	NA	NA	NA	1/W	Calculated
Total Nitrogen – Year to Date <sup>b</sup>	3, 6	NL mg/L	NA	NA	NA	1/M	Calculated
Total Nitrogen - Calendar Year <sup>b</sup>	3, 6	4.0 mg/L	NA	NA	NA	1/YR	Calculated
Total Phosphorus	3, 5	NL mg/L	NA	NA	NA	1/W	24H-C
Total Phosphorus – Year to Date <sup>b</sup>	3, 6	NL mg/L	NA	NA	NA	1/M	Calculated
Total Phosphorus - Calendar Year <sup>b</sup>	3, 6	0.30 mg/L	NA	NA	NA	1/YR	Calculated
Chronic Toxicity – <i>C. dubia</i> (TU <sub>c</sub> )		NA	NA	NA	NL	1/3M	24H-C
Chronic Toxicity – <i>P. promelas</i> (TU <sub>c</sub> )		NA	NA	NA	NL	1/3M	24H-C

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgment
3. Water Quality Standards
4. DEQ Disinfection Guidance
5. VIMS Stream Model
6. 9VAC25-40 (Nutrient Regulation)

MGD = Million gallons per day.

NA = Not applicable.

NL = No limit; monitor and report.

S.U. = Standard units.

TIRE = Totalizing, indicating and recording equipment.

1/D = Once every day.

1/W = Once every week.

1/M = Once every month.

1/YR = Once every year.

1/3M = Once every three months.

24H-C = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the Monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by  $\geq 10\%$  or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

a. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite

b. See Section 20.a. for the calculation of the Nutrient Calculations. b. See Section 20.a. for the calculation of the Nutrient Calculations.

**19. Effluent Limitations/Monitoring Requirements:**

Design flow is 13.0 MGD.

Effective Dates: During the period beginning with the issuance of the CTO for the 13.0 MGD flow tier and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	3	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
CBOD <sub>5</sub>	3,5	9 mg/L 440 kg/day	14 mg/L 690 kg/day	NA	NA	1/D	24H-C
Total Suspended Solids (TSS)	2	9.0 mg/L 440 kg/day	14 mg/L 690 kg/day	NA	NA	1/D	24H-C
TKN (mg/L) (May through October)	3,5	6.0 mg/L 650 lb/day	9.0 mg/L 980 lb/day	NA	NA	1/W	24H-C
TKN (mg/L) (November through April)	3	NL	NL	NA	NA	1/W	24H-C
Ammonia as N	3	4.7 mg/L	5.6 mg/L	NA	NA	1/D	24H-C
Dissolved Oxygen	3, 5	NA	NA	6.0 mg/L	NA	1/D	Grab
<i>E. coli</i> (Geometric Mean)	3	126 n/100mls	NA	NA	NA	1/D	Grab
Nitrate+Nitrite, as N	3, 6	NL mg/L	NA	NA	NA	1/W	24H-C
Total Nitrogen <sup>a</sup>	3, 6	NL mg/L	NA	NA	NA	1/W	Calculated
Total Nitrogen – Year to Date <sup>b</sup>	3, 6	NL mg/L	NA	NA	NA	1/M	Calculated
Total Nitrogen - Calendar Year <sup>b</sup>	3, 6	3.0 mg/L	NA	NA	NA	1/YR	Calculated
Total Phosphorus	3, 5	NL mg/L	NA	NA	NA	1/W	24H-C
Total Phosphorus – Year to Date <sup>b</sup>	3, 6	NL mg/L	NA	NA	NA	1/M	Calculated
Total Phosphorus - Calendar Year <sup>b</sup>	3, 6	0.30 mg/L	NA	NA	NA	1/YR	Calculated
Chronic Toxicity – <i>C. dubia</i> (TU <sub>c</sub> )		NA	NA	NA	NL	1/3M	24H-C
Chronic Toxicity – <i>P. promelas</i> (TU <sub>c</sub> )		NA	NA	NA	NL	1/3M	24H-C

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgment
3. Water Quality Standards
4. DEQ Disinfection Guidance
5. VIMS Stream Model
6. 9VAC25-40 (Nutrient Regulation)

MGD = Million gallons per day.

NA = Not applicable.

NL = No limit; monitor and report.

S.U. = Standard units.

TIRE = Totalizing, indicating and recording equipment.

1/D = Once every day.

1/W = Once every week.

1/M = Once every month.

1/3M = Once every three months.

1/YR = Once every year.

**24H-C** = A flow proportional composite sample collected manually or automatically, and discretely or continuously, for the entire discharge of the Monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of twenty-four (24) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum twenty-four (24) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by  $\geq 10\%$  or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

a. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite

b. See Section 20.a. for the calculation of the Nutrient Calculations.

**20. Other Permit Requirements:**

- a) Part I.B. of the permit contains quantification levels and compliance reporting instructions. 9VAC25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

The calculations for the Nitrogen and Phosphorus parameters shall be in accordance with the calculations set forth in 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*. §62.1-44.19:13 of the Code of Virginia defines how annual nutrient loads are to be calculated; this is carried forward in 9VAC25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, these reporting calculations are intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

- b) Permit Section Part I.C., details the requirements for Toxics Management Program.

The VPDES Permit Regulation at 9VAC25-31-210 requires monitoring and 9VAC25-31-220.I, requires limitations in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. A TMP is imposed for municipal facilities with a design rate >1.0 MGD, with an approved pretreatment program or required to develop a pretreatment program, or those determined by the Board based on effluent variability, compliance history, IWC, and receiving stream characteristics.

Little Falls Run WWTP meets two of the above requirements, it is a POTW with a design rate >1.0 MGD, and the facility has an approved pretreatment program. The TMP uses bioassay-testing methods for measuring the potential for the effluent to cause toxicity in the receiving stream. During the current permit term, Little Falls Run WWTP has performed annual chronic toxicity tests using 24-hour flow-proportioned composite samples of the final effluent. James R. Reed & Associates in Newport News, Virginia conducted the tests. A summary of the results to date is found in Attachment 10.

The proposed permit includes TMP language that requires Little Falls Run WWTP to perform annual chronic toxicity testing for the duration of the permit; there are no requirements for the acute test. When the facility receives the CTO for any of the expanded flow tiers, the facility will conduct eight quarterly toxicity tests beginning 6 months after the issuance of the CTO for the expanded flow tier. If the facility passes, then they can request a monitoring reduction.

- c) Permit Section Part I.D., details the requirements of a Pretreatment Program.

The VPDES Permit Regulation at 9VAC25-31-210 requires monitoring and 9VAC25-31-220.D. requires all discharges to protect water quality. The VPDES Permit Regulation at 9VAC25-31-730. through 900., and 40 CFR Part 403 requires POTWs with a design flow of >5 MGD and receiving from Industrial Users (IUs) pollutants which pass through or interfere with the operation of the POTW or are otherwise subject to pretreatment standards to develop a pretreatment program.

The Pretreatment Program for Stafford County (Little Falls Run WWTP and Aquia WWTP) was originally approved January 3, 1996. Stafford County has one (1) Significant Industrial User (SIU) regulated through this program. There is one Categorical Industrial User (CIU, Colonial Circuits that discharges to Little Falls Run WWTP on an intermittent basis. This CIU is a metal finisher and is subject to categorical pretreatment standards and local limits. Stafford County performed the IU survey for the Aquia WWTP and did not identify any additional SIUs.

The pretreatment program conditions in the proposed permit will include: implementation of the approved pretreatment program that complies with the Clean Water Act, Water Control Law, State regulations and the approved program; submission to the Northern Regional Office of an annual report, by January 31<sup>st</sup> of each year, that describes the permittee's program activities over the previous year; submission of a survey of all the Industrial Users discharging to the POTW within 180 days of the permit's effective date; submission of any program changes prior to implementation; issuance and reissuance of all SIU permits in a timely manner, inspection and sampling of all SIUs annually, implementation of the reporting requirement of Part VII of the VPDES Permit Regulation; review of the Enforcement Response Plan; reevaluation of the local limits within one year of the permit's effective date; maintenance of adequate resources to implement the approved program; and meet all public participation and public notice requirements.

d) Permit Section Part 1.E. details requirements of the Sewage Sludge Management Plan, Sludge Monitoring and Additional Reporting Requirements.

1. Regulations:

The VPDES Permit Regulation (9VAC25-31-10 et seq.), has incorporated technical standards for the use or disposal of sewage sludge, specifically land application and surface disposal, promulgated under 40 CFR Part 503.

The Permit Regulation (9VAC25-31-420) also establishes the standards for the use or disposal of sewage sludge. This part establishes standards that consist of general requirements, pollutant limits, management practices, and operational standards for the final use or disposal of sewage sludge generated during the treatment of domestic sewage in the treatment works.

2. Evaluations:

Sludge Classification:

The Little Falls Run WWTP is considered as Class I sludge management facility. The permit regulation (9VAC25-31-500) defines a Class I sludge management facility as any POTW which is required to have an approved pretreatment program defined under Part VII of the VPDES Permit Regulation (9VAC25-31-730 to 900) and/or any treatment works treating domestic sewage sludge that has been classified as a Class I facility by the Board because of the potential for its sewage sludge use or disposal practice to adversely affect public health and the environment.

Sludge Pollutant Concentration:

The average pollutant concentrations from sewage sludge analyses provided as part of the Little Falls Run WWTP application for the permit reissuance are presented in Table 6. The analysis results are from samples collected during the period from January 2008 through December 2008.

Table 6 – Little Falls Run WWTP Results

Pollutant	Average Concentration (mg/kg dry weight)	Sample Type
Arsenic	4.5	Composite
Cadmium	2.0	Composite
Copper	541	Composite
Lead	26.5	Composite
Mercury	1.5	Composite
Molybdenum	6.25	Composite
Nickel	34.8	Composite
Selenium	5.98	Composite
Zinc	772	Composite

All sewage sludge applied to the land must meet the ceiling concentration for pollutants, listed in Table 7. Sewage sludge applied to the land must also meet either pollutant concentration limits, cumulative pollutant loading rate limits, or annual pollutant loading rate limits, also listed in Table 7.

Cumulative pollutant loading limits or annual pollutant loading limits may be applied to sewage sludge exceeding pollutant concentration limits but meeting the ceiling concentrations, depending upon the levels of treatment achieved and the form (bulk or bag) of sludge applied. It should be noted that ceiling concentration limits are instantaneous values and pollutant concentration limits are monthly average values. Calculations of cumulative pollutant loading should be based on the monthly average values and the annual whole sludge application rate.

Table 7- SEWAGE SLUDGE POLLUTANT LIMITS

Pollutant	Ceiling Concentration Limits for All Sewage Sludge Applied to Land (mg/kg)*	Pollutant Concentration Limits for EQ and PC Sewage Sludge (mg/kg)*	Cumulative Pollutant Loading Rate Limits for CPLR Sewage Sludge (kg/hectare)	Annual Pollutant Rate Limits for APLR Sewage Sludge (kg/hectare/356 day period)**
Arsenic	75	41	41	2.0
Cadmium	85	39	39	1.9
Copper	4,300	1,500	1,500	75
Lead	840	300	300	15
Mercury	57	17	17	0.85
Molybdenum	75	---	---	---
Nickel	420	420	420	21
Selenium	100	100	100	5.0
Zinc	7,500	2,800	2,800	140
Applies to:	All sewage sludge that is land applied	Bulk sewage sludge and bagged sewage sludge	Bulk sewage sludge	Bagged sewage
From VPDES Permit Reg. Part VI	Table 1, 9 VAC 25-31-540	Table 3, 9 VAC 25-31-540	Table 2, 9 VAC 25-31-540	Table 4, 9 VAC 25-31-540

\*Dry-weight basis

\*\*Bagged sewage sludge is sold or given away in a bag or other container.

Comparing data from Table 6 with Table 7 shows that metal concentrations are significantly below the ceiling and PC concentration requirements.

### 3. Options for Meeting Land Application:

There are four equally safe options for meeting land application requirements. The options include the Exceptional Quality (EQ) option, the Pollutant Concentration (PC) option, the Cumulative Pollutant Loading Rate (CPLR) option, and the Annual Pollutant Loading Rate (APLR) option.

Pollutant Concentration (PC) is the type of sludge that may only be applied in bulk and is subject to general requirements and management practices; however, tracking of pollutant loadings to the land is not required. The sludge from the Little Falls Run WWTP is considered Pollutant Concentration (PC) sewage sludge for the following reasons:

a) The bulk sewage sludge from the Little Falls Run WWTP meets the PC limits in Table 1 of VPDES Permit Regulation Part VI, 9 VAC 25-31-540.

b) The VPDES Permit Regulation, Part VI, Subpart D, (9VAC25-31-690 through 720) establishes the requirements for pathogen reduction in sewage sludge. The Little Falls Run WWTP is considered to produce a Class B sludge in accordance with the regulation (9VAC25-31-710.B.2. - Class B -Alternative 1. Alternative 1 defines Class B sludge as "The geometric mean of the density of fecal coliform in the samples collected in subdivision 2 a of this subsection shall be less than either 2,000,000 MPN per gram of

total solids (dry weight basis) or 2,000,000 CFU per gram of total solids (dry weight basis). Sewage sludge that is used or disposed that has been treated in a process that is equivalent to a Process to Significantly Reduce Pathogens (PSRP), as described in (9VAC25-31-710.D.1).

c) The VPDES Permit Regulation, Part VI, Subpart D, (9VAC25-31-690 through 720) also establishes the requirements for Vector Attraction Reduction in sewage sludge. Based on the information supplied with the VPDES Sludge Application, the Little Falls Run WWTP meets the requirements for Vector Attraction Reduction as defined by (9VAC25-31-720.B.4): the specific oxygen uptake rate for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20 degrees Celsius according to the method in 9VAC25-31-490.B.

#### 4) Parameters to be Monitored:

In order to assure the sludge quality, the following parameters require monitoring: Arsenic, Cadmium, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, and Zinc.

In order to ensure that proper nutrient management and pH management practices are employed, the following parameters are required: pH, Total Kjeldahl Nitrogen, Ammonia Nitrogen, Nitrate Nitrogen, Total Phosphorus, Total Potassium, and Alkalinity (lime treated sludge should be analyzed for percent calcium carbonate equivalence). The nutrient and pH monitoring requirements apply only if the permittee land applies their own sludge. Since Little Falls Run WWTP has contracted the land application responsibilities to Synagro Mid-Atlantic Inc of Baltimore, Maryland, they are not required to monitor for nutrients, pH, Total Potassium and Alkalinity.

Soil monitoring in conjunction with soil productivity information is critical, especially for frequent applications, to making sound sludge application decisions from both an environmental and an agronomic standpoint. Since Little Falls Run WWTP has contracted the land application responsibilities to Synagro Mid-Atlantic Inc of Baltimore, Maryland, they are not required to perform soil monitoring.

#### 5) Monitoring Frequency:

The monitoring frequency is based on the amount of sewage sludge applied in a given 365-day period. The permit application indicates that the total dry metric tons of sewage sludge generated at Little Falls Run WWTP are 906.6 dry metric tons per 365-day period. In the permit manual, the monitoring frequency for facilities that produce equal to or greater than 290 metric tons but less than 1500 metric tons per 365-day period is once per quarter (four times per year). This reissuance proposes a monitoring frequency of 1/quarter.

Little Falls Run WWTP is required to provide the results of all monitoring performed in accordance with Part I.A., and information on management practices and appropriate certifications no later than February 19<sup>th</sup> of each year (as required by the 503 regulations) to the Northern Regional Office of the Department of Environmental Quality. Each report must document the previous calendar year's activities.

#### 6) Sampling:

Representative sampling is an important aspect of monitoring. Because the pollutant limits pertain to the quality of the final sewage sludge applied to the land, samples must be collected after the last treatment process prior to land application. Composite samples should be required for all samplings from this facility.

#### 7) Sludge Management Plan (SMP):

The SMP is required to be part of the VPDES permit application. The VPDES Sewage Sludge Permit Application Form and its attachments will constitute the applicant's SMP. Any proposed sewage treatment works treating domestic sewage must submit a SMP with the appropriate VPDES permit application forms at least 180 days prior to the date proposed for commencing operations. The permittee shall conduct all sewage sludge use or disposal activities in accordance with the SMP approved with the issuance of this permit. Any

proposed changes in the sewage sludge use or disposal practices or procedures followed by the permittee shall be documented and submitted for Virginia Department of Environmental review and approval no less than 90 days prior to the effective date of the changes.

Upon approval, the SMP becomes an enforceable part of the permit. The permit may be modified or alternatively revoked and reissued to incorporate limitations/conditions necessitated by substantial changes in sewage sludge use or disposal practices.

Little Falls Run WWTP has submitted the VPDES Sewage Sludge Permit Application Form and its attachments. Their SMP dated September 16, 2009, is on file at the Northern Regional Office of the Department of Environmental Quality.

#### 8) Reporting Requirements:

The reporting requirements are for POTWs with a design flow rate equal to or greater than 1 MGD (majors), POTWs that serve a population of 10,000 or greater, and Class I sludge management facilities. A permit special condition, which requires these generators to submit an annual report on February 19<sup>th</sup> of each year, is included. The Little Falls Run WWTP shall use the Discharge Monitoring Report (DMR) forms as part of the annual report. A sample form (SP1 and S01) with proper DMR parameter codes and its instructions are provided. In addition to the DMR forms, the generators who land apply sewage sludge are responsible for submitting the additional information required by 9VAC25-31-590, *i.e.*, appropriate certification statements, descriptions of how pathogen and vector attraction reduction requirements are met, descriptions of how the management practices (if applicable) are being met, and descriptions of how site restrictions (if applicable) are being met.

#### 9) Records Keeping:

This special condition outlines record retention requirements for sludge meeting Class B pathogen reduction and vector attraction reduction alternative 1-10. Table 8 presents the record keeping requirements.

Table 8: Record Keeping for PC Sludge

1	Pollutant concentrations of each pollutant in Part I.A.5. of the permit;
2	Description of how the pathogen reduction requirement in Part I.A.5. of the permit are met;
3	Description of how the vector attraction requirements in Part I.A.5. of the permit are met;
4	Description of how the management practice specified in the approved Sludge Management Plan and/or the permit are met;
5	Description of how the site restriction specified in the Sludge Management Plan and/or the permit are met;
6	Certification statement in Part I.E.3.b.2.f. of the permit.

## 21. Other Special Conditions :

- 95% Capacity Reopener. The VPDES Permit Regulation at 9VAC25-31-200.B.4. requires all POTWs and PVOTWs develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period. This facility is a POTW.
- Indirect Dischargers. Required by VPDES Permit Regulation, 9VAC25-31-200 B.1. and B.2. for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.
- O&M Manual Requirement. Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790; VPDES Permit Regulation, 9VAC25-31-190.E. Within 90 days of the effective date of this permit, the permittee shall submit for approval an Operations and Maintenance (O&M) Manual or a statement confirming the accuracy and completeness of the current O&M Manual to the Department of Environmental Quality, Northern Regional Office (DEQ-NRO). Future changes to the facility must be addressed by the submittal of a revised O&M Manual within 90 days of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.

- d) CTC, CTO Requirement. The Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790 requires that all treatment works treating wastewater obtain a Certificate to Construct prior to commencing construction and to obtain a Certificate to Operate prior to commencing operation of the treatment works.
- e) Licensed Operator Requirement. The Code of Virginia at §54.1-2300 et seq. and the VPDES Permit Regulation at 9VAC25-31-200 C, and Rules and Regulations for Waterworks and Wastewater Works Operators (18VAC160-20-10 et seq.) requires licensure of operators. This facility requires a Class I operator.
- f) Reliability Class. The Sewage Collection and Treatment Regulations at 9VAC25-790 require sewage treatment works to achieve a certain level of reliability in order to protect water quality and public health consequences in the event of component or system failure. Reliability means a measure of the ability of the treatment works to perform its designated function without failure or interruption of service. The facility is required to meet a reliability Class of I.
- g) Water Quality Criteria Reopener. The VPDES Permit Regulation at 9VAC25-31-220 D. requires establishment of effluent limitations to ensure attainment/maintenance of receiving stream water quality criteria. Should effluent monitoring indicate the need for any water quality-based limitations, this permit may be modified or alternatively revoked and reissued to incorporate appropriate limitations.
- h) Sludge Reopener. The VPDES Permit Regulation at 9VAC25-31-220.C. requires all permits issued to treatment works treating domestic sewage (including sludge-only facilities) include a reopener clause allowing incorporation of any applicable standard for sewage sludge use or disposal promulgated under Section 405(d) of the CWA. The facility includes a sewage treatment works. This special condition will be in Part I.E of the permit.
- i) Sludge Use and Disposal. The VPDES Permit Regulation at 9VAC25-31-100.P; 220.B.2., and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. The facility includes a treatment works treating domestic sewage. This special condition will be in Part I.E of the permit.
- j) Nutrient Offsets. The Virginia General Assembly, in their 2005 session, enacted a new Article 4.02 (Chesapeake Bay Watershed Nutrient Credit Exchange Program) to the Code of Virginia to address nutrient loads to the Bay. Section 62.1-44.19:15 sets forth the requirements for new and expanded dischargers, which are captured by the requirements of the law, including the requirement that non-point load reductions acquired for the purpose of offsetting nutrient discharges be enforced through the individual VPDES permit.
- k) E3/E4. 9VAC25-40-70 B authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.
- l) Nutrient Reopener. 9VAC25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9VAC25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.
- m) PCB Monitoring. This special condition requires the permittee to conduct PCB dry weather and wet weather monitoring using ultra-low level PCB analysis to support the development of the PCB TMDL for the fish consumption use impairment in the Rappahannock River.

- n) Mixing Zone Study. This special condition allows the permittee to conduct a site specific mixing zone study for the receiving waters and for determining wasteload allocations for toxic pollutants and request that the permit be modified to reflect the results. Protocols for such a study must be approved by DEQ prior to initiation of the study and must account for all major dischargers in closer proximity to Little Falls Run WWTP.

Permit Section Part II. Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

### 23. Changes to the Permit from the Previously Issued Permit:

- a) Special Conditions:
- 1) The Nutrient Calculations special condition was removed. The calculations are now found in Part I.B. of the permit.
  - 2) A PCB monitoring special condition was added to the permit.
  - 3) The Nutrient Trading and Offsets special condition was updated to reflect current agency guidance.
  - 4) The Nutrient Enriched Waters Reopener has been removed since the designation was repealed from the Water Quality Standards.
  - 5) An E3/E4 special condition was added.
  - 6) The Nutrients Compliance Schedule was deleted from the permit.
  - 7) A special condition requiring low-level PCB monitoring was added to the draft permit.
- b) Monitoring and Effluent Limitations:
- 1) Monthly average and weekly average ammonia as N limitations were added to all flow tiers.
  - 2) The 6 MGD tier was removed since the facility was re-rated to 8 MGD.
  - 3) The 8 MGD facility has two effluent limits pages based on Phase I and Phase II upgrade.
  - 4) The monthly average and weekly average TKN (May-October) loading limitations were changed to lb/day.
  - 5) TKN monitoring was changed to weekly since there is now an Ammonia as N limitation.
  - 6) The monthly average Total Phosphorus loading limitation for the 4.0 tier was changed to lb/day.
  - 7) The frequency of monitoring for TKN, Nitrate+Nitrite, Total Phosphorus, and Total Nitrogen were changed to once per week.
  - 8) The nutrient calendar year loadings were removed since they are now permitted through 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia*.

### 24. Variances/Alternate Limits or Conditions:

The facility requested and received the following waivers for the monitoring associated with Form 2A:

- 1) Analysis of Dissolved Metals in lieu of Total Recoverable Metals;
- 2) Waiver of second and third series of Form 2A Part D testing; and
- 3) Request to use annual toxicity testing in lieu of quarterly testing for Form 2A Part E.

### 25. Public Notice Information:

First Public Notice Date: 8/26/2010

Second Public Notice Date: 9/2/2010

Public Notice Information is required by 9VAC25-31-280 B. All pertinent information is on file and may be inspected, and copied by contacting the: DEQ Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193, Telephone No. (703) 583-3834, [Alison.Thompson@deq.virginia.gov](mailto:Alison.Thompson@deq.virginia.gov). See Attachment 11 for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer

and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may request an electronic copy of the draft permit and fact sheet or review the draft permit and application at the DEQ Northern Regional Office by appointment.

**26. 303 (d) Listed Stream Segments and Total Max. Daily Loads (TMDL):**

There are three impairments for the segment. Only one TMDL has been approved.

Recreational Use Impairment: Yes. TMDL was approved by EPA on 5/5/2008.

Fish Consumption Use Impairment: No (TMDL due by 2016)

Aquatic Life Use Impairment: No (TMDL due by 2010)

The Bacteria TMDL for the Tidal Freshwater Rappahannock River included a WLA for VA0076392. The WLA for this facility is **2.26E+13 cfu/year of *E. coli* bacteria**. This WLA was calculated using the maximum permitted design flow (13.0 MGD).

In preparation for the PCB TMDL that will be developed for the tidal Rappahannock River by 2016, the Assessment/TMDL Staff recommend that this facility perform low-level PCB monitoring during the upcoming permit cycle. TMDL Guidance Memo No. 09-2001 recommends that major, municipal VPDES facilities collect 2 wet and 2 dry samples during the permit cycle, using EPA Method 1668B, which is capable of detecting low-level concentrations for all 209 PCB congeners.

TMDL Reopener: This special condition is to allow the permit to reopened if necessary to bring it in compliance with any applicable TMDL that may be developed and approved for the receiving stream.

**27. Additional Comments:**

Previous Board Action(s): None.

Staff Comments: None.

EPA Checklist: The checklist can be found in Attachment 12.

Public Comment: DEQ received comments from the Virginia Dept of Game and Inland Fisheries regarding the discharge from this facility. The comments are found below.

We have reviewed the above-referenced VPDES permit renewal. According to DEQ, the Little Falls Run facility consists of preliminary treatment with mechanical bar screens and grit and grease removal followed by biological treatment with Schreiber counter-current, low load aeration system to provide biological nutrient removal. The Schreiber process is followed by clarification, lime and alum addition, tertiary sand/anthracite filters, ultraviolet light disinfection, and post aeration via rip rap in the outfall channel prior to discharge in the Rappahannock River.

According to the VPDES cover sheet, it appears that the existing average design flow is 3.9 MGD (Max. Daily Flow per 2009 permit application is 6.946 MGD).

- According to page 19.a, the design flow is 4.0 MGD (during the period permit is effective until 6.0 MGD design flow becomes effective).
- According to page 19.b, the design flow is 6.0 MGD (lasting until December 31, 2009).

- According to page 19.c, the design flow is 6.0 MGD (effective January 1, 2010 until the design flow becomes 8.0 MGD or until the permit expires, whichever comes first).
- According to page 19.d, the design flow of this facility is 8.0 MGD (effective during the period beginning with the issuance of the Operating Permit (OP) for 8.0 MGD through issuance of OP for 13.0 MGD, or until the expiration date, whichever comes first).

According to DEQ, Stafford County has asked for all these flow tiers to remain in the permit. A County typically asks for multiple flow tiers because they are uncertain of the timing of development projects that have been approved by the locality. In this case, treatment capacity can then expand incrementally, placing a smaller financial burden on the County (treatment works). The facility is currently working on the components necessary to obtain the Certificate To Operate (CTO) for the 6 MGD flow tier and to upgrade the facility for nutrient removal to meet the requirements of their wasteload allocation in 9VAC25-820.

According to our records, the federal Endangered state Endangered (FESE) dwarf wedgemussel and state Threatened (ST) green floater are known from the project area. The Rappahannock Rivers is a designated Threatened and Endangered (T&E) species water for these species. The Rappahannock River is also a designated Anadromous Fish Use area.

According to the VPDES renewal application, at the design discharge of 6 MGD during the 1-day low flow (1Q10 Low flow: 26.5 MGD) and weekly low flow (7Q10 Low flow: 32.9 MGD) for 10 year period the dilution factor is approximately 4 to 5 respectively. The weekly TKN average is 9 mg/l from May through October, and No Limit (NL) from November through April (with pH from 6 to 9 s.u.). At the design discharge of 8 MGD during the 1-day low flow (1Q10 Low flow: 26.5 MGD) and weekly low flow (7Q10 Low flow: 32.9 MGD) for 10 year period the dilution factor is approximately 3 to 4 respectively. The weekly TKN average is 9 mg/l from May through October, and No Limit (NL) from November through April (with pH from 6 to 9 s.u.). Based on the information provided, the ammonia levels proposed in the above-referenced VPDES permit renewal are not protective of freshwater mussels. This is especially true when using NL during November through April, which is based on an assumption of low water temperatures.

We recommend the continued use of ultraviolet (UV) light disinfection, rather than chlorination. The ammonia limits proposed within the EPA rule are expressed on the basis of total ammonia-nitrogen (TAN). The proposed EPA ammonia limit for waters with mussels (not T&E mussels, any mussel species) is:

- CMC (Criterion Maximum Concentration or acute) - 2.9 mg N/L (at pH 8 and 25C)
- CCC (Criterion Continuous Concentration or chronic) - 0.26 mg N/L (at pH 8 and 25C) with a 4-day average within the 30 day average period no higher than 2.5 the CCC, which would be 0.65 mg N/L.

The ammonia limits proposed within the EPA rule are the best information currently available regarding ammonia levels protective of mussels. Therefore, we recommend the EPA values be implemented in this permit for this and all future VPDES permits. We also recommend contacting the USFWS regarding all federally listed species.

In response to the comments received from DGIF, staff reviewed the ambient data from the Ambient Monitoring Station, 3-RPP104.47, located 100 yards below the Massaponax WWTF outfall. Staff has evaluated the receiving stream ambient monitoring data for NH<sub>3</sub>+NH<sub>4</sub> during the period of February 21, 1991 to April 8, 2008. The ambient data does not show any instream exceedances of the established ammonia criteria or the new wasteload allocations set for the discharge. The highest observed instream value was 0.81 mg/L on March 15, 2001. There were three data points that ranged from 0.32 to 0.36 mg/L. There were seven data points between 0.2 and 0.29 mg/L. All other values from this monitoring station were less than 0.2 mg/L.

Staff did re-evaluate TKN effluent limitations based on the new wasteload allocation determination for the discharge. Although the VIMS model and the ambient monitoring demonstrate that the current TKN limitation of 6.0 mg/L is protective of the ammonia as N criteria; staff has proposed new ammonia effluent limitations due to the re-evaluation of the river flows, pH and temperature data, and recalculation of the ammonia WLAs using the methodology used for metals WLAs. These new limitations are protective of the existing Virginia water quality criteria for ammonia as N. The referenced EPA rule where ammonia limits are expressed based on the basis of total ammonia-nitrogen (TAN) have not been finalized or adopted. Until such time that the Water Quality Standards are updated to incorporate new ammonia criteria, it is staff's responsibility to implement current

standards and apply best professional judgment to continue utilizing the tools and approaches that have been shown to be successful.

It should also be noted that the facility is currently designed to meet a Total Nitrogen of 8 mg/L and is finishing an upgrade to meet a Total Nitrogen of 6 mg/L. Facilities like Little Falls Run that are designed for nitrification and denitrification, will not see appreciable ammonia concentrations. Effluent data review for this facility from January 2001 to March 2010 had an average effluent concentration of 0.27 mg/L.

Attachments to the Little Falls Run WWTP Fact Sheet

Attachment 1	Flow Determination and MIX.exe calculations
Attachment 2	Topographic Map of outfall location
Attachment 3	Facility Schematic
Attachment 4	VA0076392 Planning Statement
Attachment 5	Water Quality Criteria calculations 2:1 dilution for metals/organics 5:2 dilution for ammonia as N pH and Temperature data used for Ammonia as N criteria development
Attachment 6	STATS printout for Ammonia as N
Attachment 7	2001 Memorandum for Zinc limitations
Attachment 8	VIMS Summary
Attachment 9	Toxics Monitoring Summary
Attachment 10	Public Notice
Attachment 11	EPA Checklist

March 26, 2010  
**MEMORANDUM**

TO: VPDES Reissuance File VA0076392

FROM: Alison Thompson

SUBJECT: Flow Frequency Determination of VPDES Permit No. VA0076392  
Little Falls Run WWTP

COPIES:

The Flow Frequency determination for Little Falls Run WWTP's outfall on the Rappahannock River was last conducted in 1998. The determination was carried forward during the 2005 reissuance. Since that time, the data at the continuous record gage on the Rappahannock River near Fredericksburg, VA (#01668000) has been updated and now includes the 30Q10 determination. In 1998 the flow frequencies at the outfall location were determined using values at the Rappahannock River site (#01668000) and adjusting them by proportional drainage areas. The Rappahannock River near Fredericksburg, VA measurement site has a 1596 sq. mi. drainage area; the drainage area at the outfall is 1650 sq.mi. These flow figures are used for determining the Instream Waste Concentration for the significant dischargers in the upper tidal Rappahannock River and approximating the dilution factors to be used to determine the WLAs for metals, organics, and Ammonia as N.

Rappahannock River near Fredericksburg, VA (#01668000)

Drainage area	=	1596 sq. mi.
1Q10	=	38 cfs
7Q10	=	46 cfs
30Q5	=	124 cfs
30Q10	=	78 cfs
High flow 1Q10	=	303 cfs
High flow 7Q10	=	359 cfs
High flow 30Q10	=	494 cfs
HM	=	463 cfs

Rappahannock River at the discharge point

Drainage area	=	1650 sq. mi.	
1Q10	=	39 cfs	25 MGD
7Q10	=	47.6 cfs	31 MGD
30Q5	=	128 cfs	83 MGD
30Q10	=	81 cfs	52 MGD
High flow 1Q10	=	313 cfs	202 MGD
High flow 7Q10	=	371 cfs	240 MGD
High flow 30Q10	=	511 cfs	330 MGD
HM	=	479 cfs	309 MGD

## Mixing Zone Predictions for Little Falls Run

Effluent Flow = 13 MGD  
Stream 7Q10 = 31 MGD  
Stream 30Q10 = 52 MGD  
Stream 1Q10 = 25 MGD  
Stream slope = .001 ft/ft  
Stream width = 100 ft  
Bottom scale = 2  
Channel scale = 1

*notes  
May-Oct*

---

### Mixing Zone Predictions @ 7Q10

Depth = 1.1007 ft  
Length = 11945.67 ft  
Velocity = .6188 ft/sec  
Residence Time = .2234 days

#### Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

---

### Mixing Zone Predictions @ 30Q10

Depth = 1.3942 ft  
Length = 9772.23 ft  
Velocity = .7217 ft/sec  
Residence Time = .1567 days

#### Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

---

### Mixing Zone Predictions @ 1Q10

Depth = 1.0073 ft  
Length = 12877.73 ft  
Velocity = .584 ft/sec  
Residence Time = 6.1252 hours

#### Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 16.33% of the 1Q10 is used.

---

## Mixing Zone Predictions for Little Falls Run

Effluent Flow = 13 MGD  
Stream 7Q10 = 240 MGD  
Stream 30Q10 = 330 MGD  
Stream 1Q10 = 202 MGD  
Stream slope = .001 ft/ft  
Stream width = 100 ft  
Bottom scale = 2  
Channel scale = 1

---

### Mixing Zone Predictions @ 7Q10

Depth = 3.1935 ft  
Length = 4788.36 ft  
Velocity = 1.2259 ft/sec  
Residence Time = .0452 days

#### Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

---

### Mixing Zone Predictions @ 30Q10

Depth = 3.8537 ft  
Length = 4059.76 ft  
Velocity = 1.3778 ft/sec  
Residence Time = .0341 days

#### Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

---

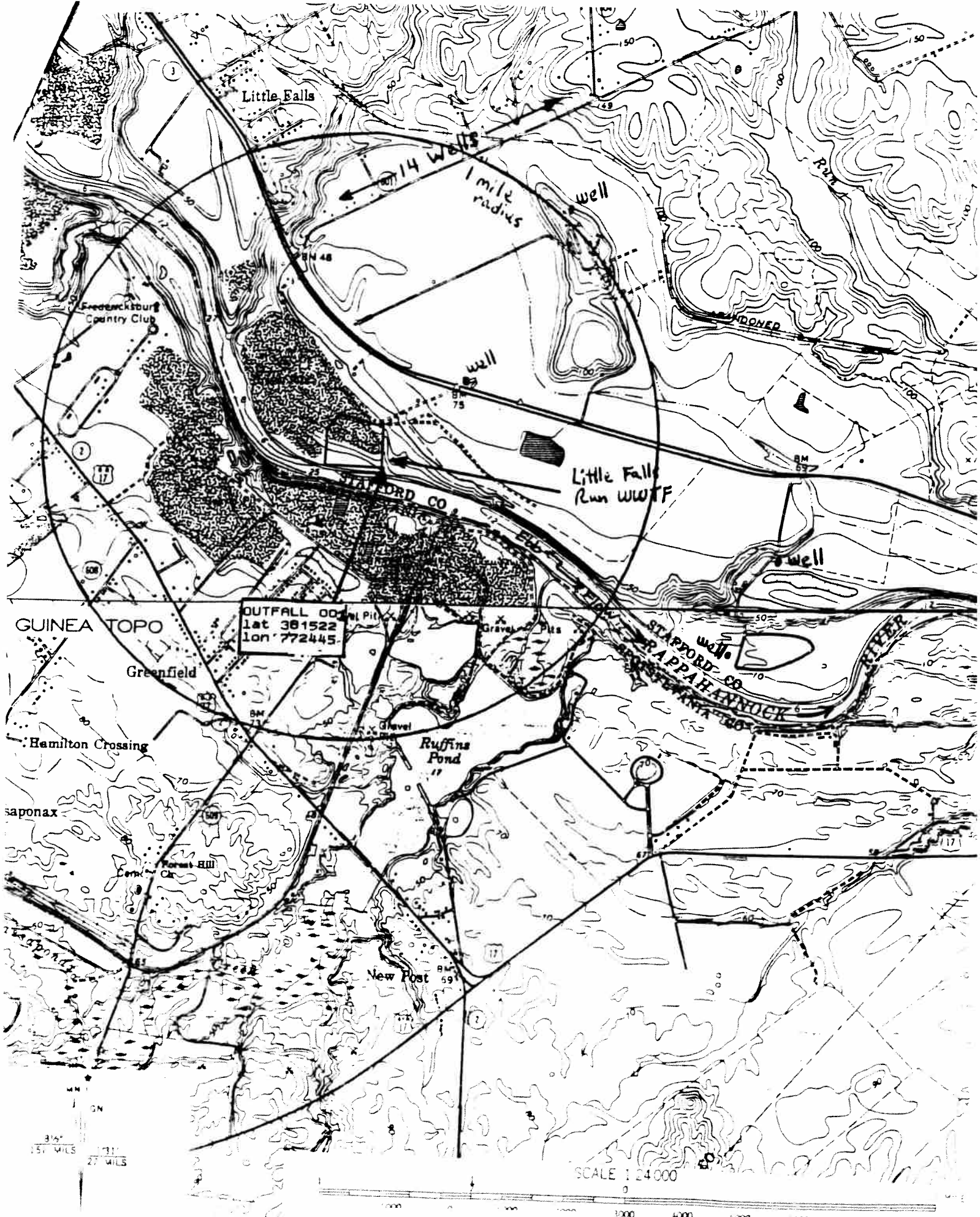
### Mixing Zone Predictions @ 1Q10

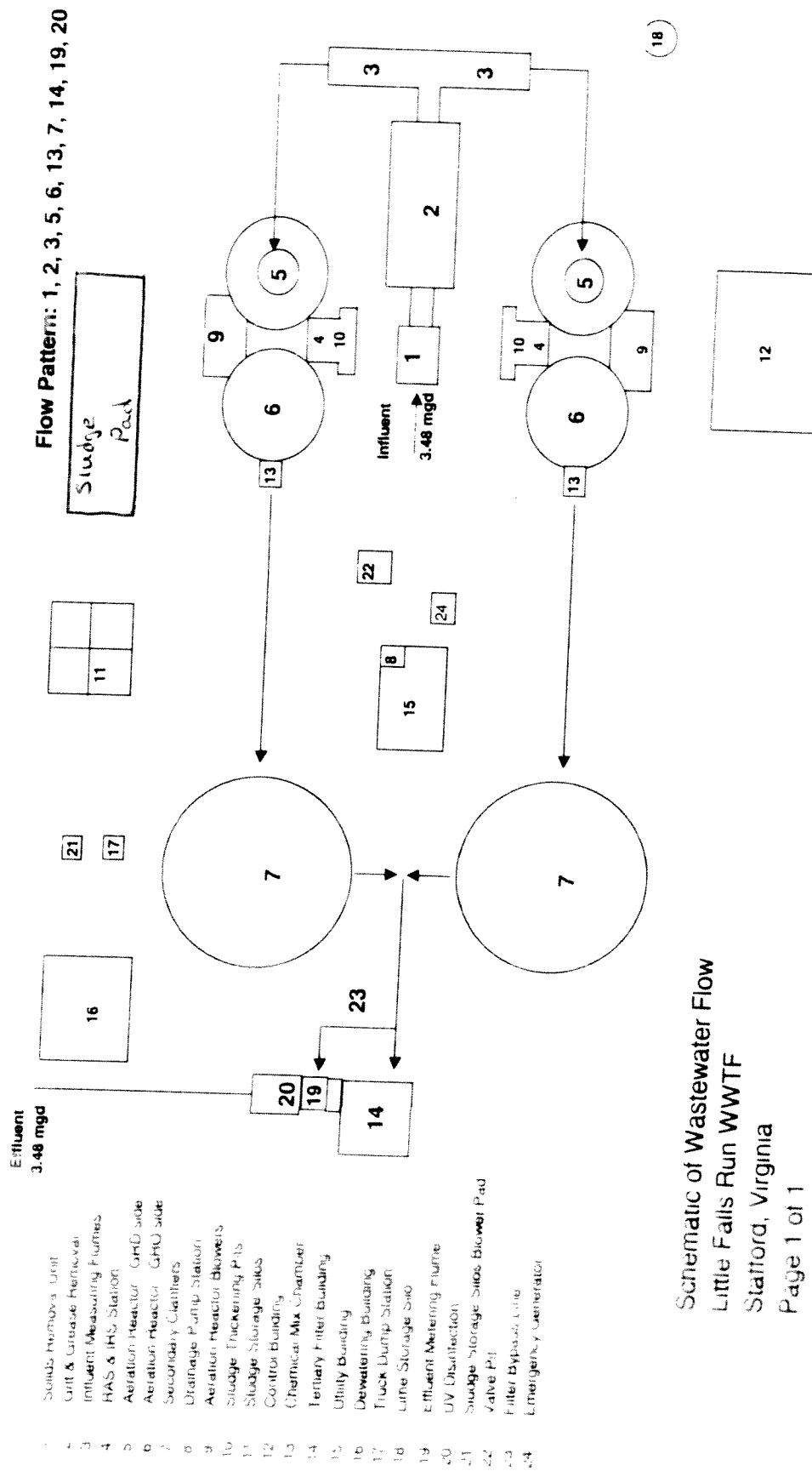
Depth = 2.8908 ft  
Length = 5221.21 ft  
Velocity = 1.1513 ft/sec  
Residence Time = 1.2598 hours

#### Recommendation:

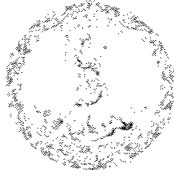
A complete mix assumption is appropriate for this situation providing no more than 79.38% of the 1Q10 is used.

---





Schematic of Wastewater Flow  
Little Falls Run WWTF  
Stafford, Virginia  
Page 1 of 1



# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF ENVIRONMENTAL QUALITY

### NORTHERN REGIONAL OFFICE

13901 Crown Court, Woodbridge, Virginia 22193

(703) 583-3800 Fax (703) 583-3821

[www.deq.virginia.gov](http://www.deq.virginia.gov)

L. Preston Bryant, Jr.  
Secretary of Natural Resources

David K. Paylor  
Director

Thomas A. Faha  
Regional Director

January 14, 2009

Mr. Harry Critzer  
Stafford County Utilities  
P.O. Box 339  
Stafford, VA 22554

**Re: Little Falls WWTF – permit # VA0076392**

Dear Mr. Critzer:

Enclosed are copies of the technical, storm water, and sample inspection reports generated from observations made while performing a Facility Technical Inspection at Little Falls Run – Wastewater Treatment Facility (WWTF) on December 18, 2008. The laboratory inspection will be sent under a separate cover. The compliance staff would like to thank Mike Smith and his staff for their time and assistance during the inspection.

Please note the requirements and recommendations addressed in the required corrective actions section, and submit in writing a progress report to this office by **February 16, 2009** for the items addressed. Your response may be sent either via the US Postal Service or electronically, via E-mail. If you chose to send your response electronically, we recommend sending it as an Acrobat PDF or in a Word-compatible, write-protected format. Additional inspections may be conducted to confirm that the facility is in compliance with permit requirements.

If you have any questions or comments concerning this report, please feel free to contact me at the Northern Regional Office (NRO) at (703) 583-3882 or by E-mail at [smallen@deq.virginia.gov](mailto:smallen@deq.virginia.gov).

Sincerely,

A handwritten signature in cursive script that reads "Sharon Allen".

Sharon Allen  
Environmental Specialist II

cc: Permits / DMR File  
EPA Copy- Major OWCP (Steve Stell)  
Mike Smith- Little Falls Run Chief Operator

**DEQ  
WASTEWATER FACILITY INSPECTION REPORT  
PREFACE**

VPDES/State Certification No.	(RE) Issuance Date	Amendment Date	Expiration Date
<b>VA0076392</b>	<b>June 6, 2005</b>		<b>June 5, 2010</b>
Facility Name	Address	Telephone Number	
<b>Little Falls Waste Water Treatment Facility (WWTF)</b>	<b>950 Kings Highway Fredericksburg, VA 22405</b>	<b>540-658-5120</b>	
Owner Name	Address	Telephone Number	
<b>Stafford County Utilities</b>	<b>P.O. Box 339, Stafford, VA 22554</b>	<b>540-659-8695</b>	
Responsible Official	Title	Telephone Number	
<b>Harry Critzer</b>	<b>Assistant Director of Utilities</b>	<b>540-659-8695</b>	
Responsible Operator	Operator Cert. Class/number	Telephone Number	
<b>Mike Smith</b>	<b>Class I; 1909 000722</b>	<b>540-658-5120</b>	

TYPE OF FACILITY:

DOMESTIC				INDUSTRIAL			
Federal		Major	<b>X</b>	Major		Primary	
Non-federal	<b>X</b>	Minor		Minor		Secondary	

INFLUENT CHARACTERISTICS:

DESIGN:

	Flow	<b>4.0</b>	
	Population Served	<b>40,440</b>	
	Connections Served	<b>13,450</b>	
	BOD <sub>5</sub> (Oct 2008)	<b>207</b>	
	TSS (Oct 2008)	<b>298</b>	

EFFLUENT LIMITS: mg/L unless otherwise specified

Parameter	Min.	Avg.	Max.	Parameter	Min.	Avg.	Max.
<b>Flow, MGD</b>		<b>NL</b>	<b>NA</b>	<b>pH, s.u.</b>	<b>6.0</b>		<b>9.0</b>
<b>Dissolved Oxygen</b>	<b>6.0</b>			<b>CBOD5</b>		<b>9</b>	<b>14</b>
<b>TSS</b>		<b>9</b>	<b>14</b>	<b>TKN (May-October)</b>		<b>6.0</b>	<b>9.0</b>
<b>Ammonia-N</b>		<b>NL</b>	<b>NL</b>	<b>TKN (Nov – April)</b>		<b>NL</b>	<b>NL</b>
<b>Orthophosphate</b>		<b>NL</b>	<b>NA</b>	<b>Total Phosphorous</b>		<b>2.0</b>	<b>NA</b>
<b>Total Nitrogen</b>		<b>NL</b>	<b>NA</b>	<b>Nitrate-Nitrite</b>		<b>NL</b>	<b>NA</b>

	Receiving Stream	<b>Rappahannock River</b>	
	Basin	<b>Rappahannock River</b>	
	Discharge Point (LAT)	<b>38° 15' 15"</b>	
	Discharge Point (LONG)	<b>77° 24' 15"</b>	

## FOCUSED CEI TECH/LAB INSPECTION REPORT

<b>FACILITY NAME:</b> Little Falls Run WWTF		<b>INSPECTION DATE:</b> <u>December 18, 2008</u>	
<b>PERMIT No.:</b> VPDES NO. VA0076392		<b>INSPECTOR</b> <u>Sharon Allen</u>	
<b>TYPE OF FACILITY:</b>		<b>REPORT DATE:</b> <u>January 14, 2009</u>	
<input checked="" type="checkbox"/> Municipal <input checked="" type="checkbox"/> Major <input type="checkbox"/> Industrial <input type="checkbox"/> Minor <input type="checkbox"/> Federal <input type="checkbox"/> Small Minor <input type="checkbox"/> HP <input type="checkbox"/> LP		<b>TIME OF INSPECTION:</b>	Arrival 0925 Departure 1200
		<b>TOTAL TIME SPENT (including prep &amp; travel)</b>	<u>15 Hours</u>
<b>PHOTOGRAPHS:</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>UNANNOUNCED INSPECTION?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>REVIEWED BY / Date:</b>			
<b>PRESENT DURING INSPECTION:</b>		<u>Wilamena Harback –DEQ</u> <u>Dean Carpenter , Clyde Coulter – Little Falls Run STP</u>	

## TECHNICAL INSPECTION

TECHNICAL INSPECTION		
1. Has there been any new construction? • If so, were plans and specifications approved? <b>NA</b> <u>Comments:</u> <b>Last approval was March 2004.</b>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
2. Is the Operations and Maintenance Manual approved and up-to-date? <u>Comments:</u> <b>February 13, 2006, for the Aqua Disk filters.</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
3. Are the Permit and/or Operation and Maintenance Manual specified licensed operator being met? <u>Comments:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
4. Are the Permit and/or Operation and Maintenance Manual specified operator staffing requirements being met? <u>Comments:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
5. Is there an established and adequate program for training personnel? <u>Comments:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
6. Are preventive maintenance task schedules being met? <u>Comments:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
7. Does the plant experience any organic or hydraulic overloading? <u>Comments:</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
8. Have there been any bypassing or overflows since the last inspection? <u>Comments:</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
9. Is the standby generator (including power transfer switch) operational and exercised regularly? <u>Comments:</u> <b>Exercised weekly with no load; once monthly under load</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
10. Is the plant alarm system operational and tested regularly? <u>Comments:</u> <b>The only plant alarm is a high water alarm on the filter system</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

# VA DEQ Focused CEI Tech/Lab Inspection Report

Permit #	VA0076392
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## TECHNICAL INSPECTION

11. Is sludge disposed of in accordance with the approved sludge management plan? <u>Comments:</u> Land applied by Bio Grow	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
12. Is septage received? • If so, is septage loading controlled, and are appropriate records maintained? <u>Comments:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
13. Are all plant records (operational logs, equipment maintenance, industrial waste contributors, sampling and testing) available for review and are records adequate? <u>Comments:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
14. Which of the following records does the plant maintain? <div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> Operational logs</span> <span><input checked="" type="checkbox"/> Instrument maintenance &amp; calibration</span> </div> <div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> Mechanical equipment maintenance</span> <span><input checked="" type="checkbox"/> Industrial Waste Contribution (Municipal facilities)</span> </div> <u>Comments:</u>	
15. What does the operational log contain? <div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> Visual observations</span> <span><input checked="" type="checkbox"/> Flow Measurement</span> <span><input checked="" type="checkbox"/> Laboratory results</span> <span><input checked="" type="checkbox"/> Process adjustments</span> </div> <div style="display: flex; justify-content: space-between;"> <span><input type="checkbox"/> Control calculations</span> <span><input type="checkbox"/> Other (specify) _____</span> </div> <u>Comments:</u>	
16. What do the mechanical equipment records contain? <div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> As built plans and specs</span> <span><input checked="" type="checkbox"/> Manufacturers instructions</span> <span><input checked="" type="checkbox"/> Lubrication schedules</span> </div> <div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> Spare parts inventory</span> <span><input checked="" type="checkbox"/> Equipment/parts suppliers</span> </div> <div style="display: flex; justify-content: space-between;"> <span><input type="checkbox"/> Other (specify) _____</span> </div> <u>Comments:</u>	
17. What do the industrial waste contribution records contain (Municipal only)? <div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> Waste characteristics</span> <span><input type="checkbox"/> Impact on plant</span> <span><input checked="" type="checkbox"/> Locations and discharge types</span> </div> <div style="display: flex; justify-content: space-between;"> <span><input type="checkbox"/> Other (specify) _____</span> </div> <u>Comments:</u> <b>One significant industrial discharger – Colonial Circuit</b>	
18. Which of the following records are kept at the plant and available to personnel? <div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> Equipment maintenance records</span> <span><input checked="" type="checkbox"/> Operational log</span> <span><input type="checkbox"/> Industrial contributor records</span> </div> <div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> Instrumentation records</span> <span><input checked="" type="checkbox"/> Sampling and testing records</span> </div> <u>Comments:</u>	
19. List records not normally available to plant personnel and their location: <u>Comments:</u> <b>NA</b>	
20. Are the records maintained for the required time period (three or five years)? <u>Comments:</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

# VA DEQ Focused CEI Tech/Lab Inspection Report

<b>Permit #</b>	<b>VA0076392</b>
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## UNIT PROCESS EVALUATION SUMMARY SHEET

<u>UNIT PROCESS</u>	<u>APPLICABLE</u>	<u>PROBLEMS*</u>	<u>COMMENTS</u>
Sewage Pumping	Y		
Flow Measurement (Influent)	Y	6	<i>The pumps on the magnesium hydroxide tank have been freezing up. Contractors were on site working on correcting the problem during this inspection.</i>
Screening/Comminution	Y		<i>The scrapers on the mechanical bar screens were replaced in kind since the last inspection and are operating well.</i>
Grit Removal	Y		<i>The channel was lined with plastic 2 years ago and a new screw pump to remove grit was installed.</i>
Oil/Water Separator	N		
Flow Equalization	N		
Ponds/Lagoons	N		
Imhoff Tank	N		
Primary Sedimentation	N		
Trickling Filter	N		
Septic Tank and Sand Filter	N		
Rotating Biological Contactor	N		
Activated Sludge Aeration	Y		<i>Schreiber Units. One unit was off line and drained.</i>
Biological Nutrient Removal	Y		
Sequencing Batch Reactor	N		
Secondary Sedimentation	Y	1	<i>One clarifier was off line. The weirs on the operating clarifier were dirty. Cleaning was scheduled for the next day.</i>
Flocculation	N		
Tertiary Sedimentation	N		
Filtration	Y		<i>Aqua Diamond cloth filters.</i>
Micro-Screening	N		
Activated Carbon Adsorption	N		
Chlorination	N		
Dechlorination	N		
Ozonation	N		
Ultraviolet Disinfection	Y		<i>Trojan 3000+</i>
Post Aeration	Y		<i>DO measured in situ. D. Carpenter – DO = 9.2 mg/L @ 15.2 deg. C .at1139. S. Allen – DO = 8.8 mg/L @ 15.1 deg. C at 1142.</i>
Flow Measurement (Effluent)	Y		
Land Application (Effluent)	N		
Plant Outfall	Y		<i>No problems noted.</i>
Sludge Pumping	Y		<i>RAS - 4 screw lift pumps, two each process train. Recirc - 4 screw lift pumps, two each process train. WAS- 4 centrifuge pumps, two each process train.</i>
Flotation Thickening (DAF)			
Gravity Thickening	Y		<i>Covered tanks.</i>
Aerobic Digestion	Y		
Anaerobic Digestion	N		
Lime Stabilization	N		
Centrifugation	Y		<i>New Andritz centrifuge installed. Two centrifuges total.</i>
Sludge Press	N		
Vacuum Filtration	N		
Drying Beds	N		
Thermal Treatment	N		
Incineration	N		
Composting	N		
Land Application (Sludge)			<i>Sludge is land applied by Synagro.</i>

\* Problem Codes

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Unit Needs Attention</li> <li>2. Abnormal Influent/Effluent</li> <li>3. Evidence of Equipment Failure</li> </ol> | <ol style="list-style-type: none"> <li>4. Unapproved Modification or Temporary Repair</li> <li>5. Evidence of Process Upset</li> <li>6. Other (explain in comments)</li> </ol> |
|--|--|

# VA DEQ Focused CEI Tech/Lab Inspection Report

Permit #

VA0076392

## INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS

- New plans for a plant upgrade were received at NRO on 8-29-08 and at VRO on 11-12-08). Staff plans for upgrade construction to begin soon.
- The plant upgrade will include a new headworks with two automatic continuous operation fine mesh screens to replace the current mechanical bar screens.
- Also as part of the plant upgrade, diffusers and paddles will be added to the traveling bridges in the Schreiber units to aid in nitrification and biological nutrient removal.
- The clarifier blanket was at 2 feet- the level is varied based on nutrient analyses.
- The weirs on the operating clarifier were dirty. Clarifiers are cleaned once a week on Friday, the day following this inspection. During cleaning, the clarifier effluent is sent back to the head of the plant in order to avoid clogging the aqua diamond disk filters will loose algae and debris.
- Filters are backwashed automatically based on head loss. Backwash water is returned to head of plant.
- The Trojan 3000+ is equipped with automatic sleeve cleaning. No manual cleaning or acid washing of the bulbs is done.
- A new Andritz centrifuge has been installed and in operation since March 2008.

# VA DEQ Focused CEI Tech/Lab Inspection Report

Permit #

VA0076392

## EFFLUENT FIELD DATA:

Flow	<u>UN</u> MGD	Dissolved Oxygen	<u>8.8</u> mg/L	TRC (Contact Tank)	<u>NA</u> mg/L
pH	<u>6.9</u> S.U.	Temperature	<u>15</u> °C	TRC (Final Effluent)	<u>NA</u> mg/L
Was a Sampling Inspection conducted? <input checked="" type="checkbox"/> Yes (see Sampling Inspection Report) <input type="checkbox"/> No					

## CONDITION OF OUTFALL AND EFFLUENT CHARACTERISTICS:

1. Type of outfall:	<input checked="" type="checkbox"/> Shore based	<input type="checkbox"/> Submerged	Diffuser?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
2. Are the outfall and supporting structures in good condition?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
3. Final Effluent (evidence of following problems):	<input type="checkbox"/> Sludge bar	<input type="checkbox"/> Grease			
	<input type="checkbox"/> Turbid effluent	<input type="checkbox"/> Visible foam	<input type="checkbox"/> Unusual color	<input type="checkbox"/> Oil sheen	
4. Is there a visible effluent plume in the receiving stream?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
5. Receiving stream:	<input checked="" type="checkbox"/> No observed problems <input type="checkbox"/> Indication of problems (explain below)				
<u>Comments:</u>					

## REQUIRED CORRECTIVE ACTIONS:

1. Compare the thermometer in the final effluent composite sampler to an NIST traceable thermometer and assure that it is labeled with the correction factor and date.
2. Assure that the O&M manual is updated to include the new centrifuge.

## NOTES and COMMENTS:

<ul style="list-style-type: none"> <li>The plant is well run and well maintained.</li> </ul>
--



To: Alison Thompson  
From: Katie Conaway

Date: October 16, 2009  
Subject: Planning Statement for Little Falls Run WWTP  
Permit Number: VA0076392

Discharge Type: Municipal  
Discharge Flow: 4 MGD, with expansions to 6.0 MGD, 8.0 MGD, and 13.0 MGD

Receiving Stream: Rappahannock River  
Latitude / Longitude: 38° 15' 22" / 77° 24' 45"  
Waterbody ID: E20E, RA46

1. Is there monitoring data for the receiving stream?

Yes.

- If yes, please attach latest summary.

VA0076392 discharges to the Rappahannock River at segment VAN-E20E\_RPP02A02. Segment VAN-E20E\_RPP02A02 extends from the confluence with Deep Run downstream to the confluence with Massaponax Creek. The nearest downstream monitoring station is 3-RPP104.47, which is located approximately 0.06 miles downstream from the Outfall of VA0076392. This segment of the Rappahannock River is part of the Chesapeake Bay Program's Rappahannock Tidal Fresh (RPPTF) segment. The RPPTF extends from the fall line at the Route 1 Bridge Crossing, downstream until rivermile 57.85. The following is a summary of the monitoring data for segment VAN-E20E\_RPP02A02 of the Rappahannock River, as taken from the 2008 Integrated Assessment:

*Class II, Section 1, special stds. a.*

*DEQ ambient monitoring station 3-RPP104.47, one hundred yards below the Massaponax Wastewater Treatment Facility, and fish tissue/sediment station 3-RPP107.33.*

*The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and sufficient excursions above the fish tissue value (TV) for PCBs in fish tissue. Additionally, excursions above the risk-based tissue screening value (TSV) of 300 parts per billion (ppb) for mercury (Hg) in fish tissue was recorded in one specie of fish (2 total samples) collected in 2006 at monitoring station 3-RPP107.33 (stripped bass), noted by an observed effect.*

*E. coli* monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. The wildlife use is considered fully supporting. The shellfishing use was not assessed.

Tidal freshwater Rappahannock B-IBI assessed as fully supporting the aquatic life use. The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use, as well. However, an open water assessment of dissolved oxygen values during the summer season showed that the RPPTF was not supporting. The segment is considered impaired for the aquatic life use.

- If no, where is the nearest downstream monitoring station.

N/A

2. Is the receiving stream on the current 303(d) list?

Yes.

- If yes, what is the impairment?

**Recreational Use Impairment:** Sufficient excursions from the instantaneous *E. coli* bacteria criterion (6 of 23 samples - 26.1%) were recorded at DEQ's ambient water quality monitoring station (3-RPP104.47), one hundred yards below the Massaponax Wastewater Treatment Facility, to assess this stream segment as not supporting of the recreation use goal for the 2008 water quality assessment. The segment was previously listed for a fecal coliform bacteria impairment, from 2002 through 2004. The *E. coli* bacteria impairment was first listed in 2006.

**Fish Consumption Use Impairment:** The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. The advisory, dated 12/13/04, limits American eel, blue catfish, carp, channel catfish, croaker, gizzard shad, and anadromous (coastal) striped bass consumption to no more than two meals per month. The affected area extends from the I-95 Bridge above Fredericksburg downstream to the mouth of the river near Stingray Point, including its tributaries Hazel Run up to the I-95 bridge crossing and Claiborne Run up to the Route 1 bridge crossing. Excursions above the water quality criterion based tissue value (TV) of 54 parts per billion (ppb) for polychlorinated biphenyls (PCBs) in fish tissue were recorded in four species of fish (6 total samples) collected in 2001 and 2006 at monitoring station 3-RPP107.33 (carp, channel catfish, gizzard shad, striped bass). As a result, the waters were assessed as not supporting of the CWA's fish consumption use goal.

**Aquatic Life Use Impairment:** An open water assessment of dissolved oxygen values during the summer season showed that the RPPTF was not supporting. The RPPTF was 0.999 percent above CFD. The segment is considered impaired for the aquatic life use.

- Has the TMDL been prepared?

Recreational Use Impairment: Yes. TMDL was approved by EPA on 5/5/2008.

Fish Consumption Use Impairment: No

Aquatic Life Use Impairment: No

- If yes, what is the WLA for the discharge?

The Bacteria TMDL for the Tidal Freshwater Rappahannock River included a WLA for VA0076392. The WLA for this facility is **2.26E+13 cfu/year of *E. coli* bacteria**. This WLA was calculated using the maximum permitted design flow (13.0 MGD).

- If no, what is the schedule for the TMDL?

Fish Consumption Use Impairment: TMDL Due by 2016

Aquatic Life Use Impairment: TMDL Due by 2010

3. If the answer to (2) above is no, is there a downstream 303(d) listed impairment?

N/A

- If yes, what is the impairment?

N/A

- Has a TMDL been prepared?

N/A

- Will the TMDL include the receiving stream?

N/A

- Is there a WLA for the discharge?

N/A

- What is the schedule for the TMDL?

N/A

4. Is there monitoring or other conditions that Planning/Assessment needs in the permit?

In preparation for the PCB TMDL that will be developed for the tidal Rappahannock River by 2016, the Assessment/TMDL Staff recommend that this facility perform low-level PCB monitoring during the upcoming permit cycle. TMDL Guidance Memo No. 09-2001 recommends that major, municipal VPDES facilities collect 2 wet and 2 dry samples during the permit cycle, using EPA Method 1668B, which is capable of detecting low-level concentrations for all 209 PCB congeners.

## Attachment 5

# FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Little Falls Run WWTP for Ammonia

Permit No.: VA0076392

Receiving Stream: Rappahannock River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO <sub>3</sub> ) =	50 mg/L	1Q10 (Annual) =	3 MGD	Annual - 1Q10 Mix =	16.33 %	Mean Hardness (as CaCO <sub>3</sub> ) =	mg/L
90% Temperature (Annual) =	27.5 deg C	7Q10 (Annual) =	3 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	27.5 deg C
90% Temperature (Wet season) =	deg C	30Q10 (Annual) =	3 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	deg C
90% Maximum pH =	7.5 SU	1Q10 (Wet season) =	3 MGD	Wet Season - 1Q10 Mix =	79.38 %	90% Maximum pH =	7.5 SU
10% Maximum pH =	SU	30Q10 (Wet season)	3 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	SU
Tier Designation (1 or 2) =	1	30Q5 =	3 MGD			Discharge Flow =	2 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	3 MGD				
Trout Present Y/N? =	n						
Early Life Stages Present Y/N? =	y						

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Acenaphthene	0	--	--	na	9.9E+02	--	--	na	2.5E+03	--	--	--	--	--	--	na
Acrolein	0	--	--	na	9.3E+00	--	--	na	2.3E+01	--	--	--	--	--	--	na
Acrylonitrile <sup>c</sup>	0	--	--	na	2.5E+00	--	--	na	6.3E+00	--	--	--	--	--	--	na
Aldrin <sup>c</sup>	0	3.0E+00	--	na	5.0E-04	3.7E+00	--	na	1.3E-03	--	--	--	--	3.7E+00	--	na
Ammonia-N (mg/l) (Yearly)	0	1.99E+01	1.89E+00	na	--	2.5E+01	4.7E+00	na	--	--	--	--	--	2.5E+01	4.7E+00	na
Ammonia-N (mg/l) (High Flow)	0	1.99E+01	4.36E+00	na	--	4.4E+01	1.1E+01	na	--	--	--	--	--	4.4E+01	1.1E+01	na
Anthracene	0	--	--	na	4.0E+04	--	--	na	1.0E+05	--	--	--	--	--	--	na
Antimony	0	--	--	na	6.4E+02	--	--	na	1.6E+03	--	--	--	--	--	--	na
Arsenic	0	3.4E+02	1.5E+02	na	--	4.2E+02	3.8E+02	na	--	--	--	--	--	4.2E+02	3.8E+02	na
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	na
Benzene <sup>c</sup>	0	--	--	na	5.1E+02	--	--	na	1.3E+03	--	--	--	--	--	--	na
Benzidine <sup>c</sup>	0	--	--	na	2.0E-03	--	--	na	5.0E-03	--	--	--	--	--	--	na
Benzo (a) anthracene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	4.5E-01	--	--	--	--	--	--	na
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	4.5E-01	--	--	--	--	--	--	na
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	4.5E-01	--	--	--	--	--	--	na
Benzo (a) pyrene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	4.5E-01	--	--	--	--	--	--	na
Bis(2-Chloroethyl) Ether <sup>c</sup>	0	--	--	na	5.3E+00	--	--	na	1.3E+01	--	--	--	--	--	--	na
Bis(2-Chloroisopropyl) Ether	0	--	--	na	6.5E+04	--	--	na	1.6E+05	--	--	--	--	--	--	na
Bis 2-Ethylhexyl Phthalate <sup>c</sup>	0	--	--	na	2.2E+01	--	--	na	5.8E+01	--	--	--	--	--	--	na
Bromoform <sup>c</sup>	0	--	--	na	1.4E+03	--	--	na	3.5E+03	--	--	--	--	--	--	na
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	4.8E+03	--	--	--	--	--	--	na
Cadmium	0	8.2E-01	4.4E-01	na	--	1.0E+00	1.1E+00	na	--	--	--	--	--	1.0E+00	1.1E+00	na
Carbon Tetrachloride <sup>c</sup>	0	--	--	na	1.6E+01	--	--	na	4.0E+01	--	--	--	--	--	--	na
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	na	8.1E-03	3.0E+00	1.1E-02	na	2.0E-02	--	--	--	--	3.0E+00	1.1E-02	na
Chloride	0	8.6E+05	2.3E+05	na	--	1.1E+06	5.8E+05	na	--	--	--	--	--	1.1E+06	5.8E+05	na

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
TRC	0	1.9E+01	1.1E+01	na	--	2.4E+01	2.8E+01	na	--	--	--	--	--	--	--	--	--	2.4E+01	2.8E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	4.0E+03	--	--	--	--	--	--	--	--	--	--	na	4.0E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Chlorodibromomethane <sup>c</sup>	0	--	--	na	1.3E+02	--	--	na	3.3E+02	--	--	--	--	--	--	na
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.8E+04	--	--	--	--	--	--	na
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	4.0E+03	--	--	--	--	--	--	na
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.8E+02	--	--	--	--	--	--	na
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.0E-01	1.0E-01	na	--	--	--	--	--	1.0E-01	1.0E-01	na
Chromium III	0	1.8E+02	2.8E+01	na	--	2.3E+02	6.9E+01	na	--	--	--	--	--	2.3E+02	6.9E+01	na
Chromium VI	0	1.6E+01	1.1E+01	na	--	2.0E+01	2.8E+01	na	--	--	--	--	--	2.0E+01	2.8E+01	na
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	na
Chrysene <sup>c</sup>	0	--	--	na	1.8E-02	--	--	na	4.5E-02	--	--	--	--	--	--	na
Copper	0	3.6E+00	3.2E+00	na	--	4.5E+00	8.0E+00	na	--	--	--	--	--	4.5E+00	8.0E+00	na
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.7E+01	1.3E+01	na	4.0E+04	--	--	--	--	2.7E+01	1.3E+01	na
DDD <sup>c</sup>	0	--	--	na	3.1E-03	--	--	na	7.8E-03	--	--	--	--	--	--	na
DDE <sup>c</sup>	0	--	--	na	2.2E-03	--	--	na	5.5E-03	--	--	--	--	--	--	na
DDT <sup>c</sup>	0	1.1E+00	1.0E-03	na	2.2E-03	1.4E+00	2.5E-03	na	5.5E-03	--	--	--	--	1.4E+00	2.5E-03	na
Demeton	0	--	1.0E-01	na	--	--	2.5E-01	na	--	--	--	--	--	--	2.5E-01	na
Diazinon	0	1.7E-01	1.7E-01	na	--	2.1E-01	4.3E-01	na	--	--	--	--	--	2.1E-01	4.3E-01	na
Dibenz(a,h)anthracene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	4.5E-01	--	--	--	--	--	--	na
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	3.3E+03	--	--	--	--	--	--	na
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	2.4E+03	--	--	--	--	--	--	na
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	4.8E+02	--	--	--	--	--	--	na
3,3-Dichlorobenzidine <sup>c</sup>	0	--	--	na	2.8E-01	--	--	na	7.0E-01	--	--	--	--	--	--	na
Dichlorobromomethane <sup>c</sup>	0	--	--	na	1.7E+02	--	--	na	4.3E+02	--	--	--	--	--	--	na
1,2-Dichloroethane <sup>c</sup>	0	--	--	na	3.7E+02	--	--	na	9.3E+02	--	--	--	--	--	--	na
1,1'-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.8E+04	--	--	--	--	--	--	na
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.5E+04	--	--	--	--	--	--	na
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	7.3E+02	--	--	--	--	--	--	na
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	na
1,2-Dichloropropane <sup>c</sup>	0	--	--	na	1.5E+02	--	--	na	3.8E+02	--	--	--	--	--	--	na
1,3-Dichloropropane <sup>c</sup>	0	--	--	na	2.1E+02	--	--	na	5.3E+02	--	--	--	--	--	--	na
Dieldrin <sup>c</sup>	0	2.4E-01	5.6E-02	na	5.4E-04	3.0E-01	1.4E-01	na	1.4E-03	--	--	--	--	3.0E-01	1.4E-01	na
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	1.1E+05	--	--	--	--	--	--	na
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	2.1E+03	--	--	--	--	--	--	na
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.8E+06	--	--	--	--	--	--	na
D-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	1.1E+04	--	--	--	--	--	--	na
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.3E+04	--	--	--	--	--	--	na
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	7.0E+02	--	--	--	--	--	--	na
2,4-Dinitrotoluene <sup>c</sup>	0	--	--	na	3.4E+01	--	--	na	8.5E+01	--	--	--	--	--	--	na
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.3E-07	--	--	--	--	--	--	na
1,2-Diphenylhydrazine <sup>c</sup>	0	--	--	na	2.0E+00	--	--	na	5.0E+00	--	--	--	--	--	--	na
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.7E-01	1.4E-01	na	2.2E+02	--	--	--	--	2.7E-01	1.4E-01	na
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.7E-01	1.4E-01	na	2.2E+02	--	--	--	--	2.7E-01	1.4E-01	na
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.7E-01	1.4E-01	--	--	--	--	--	--	2.7E-01	1.4E-01	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	2.2E+02	--	--	--	--	--	--	na
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.1E-01	9.0E-02	na	1.5E-01	--	--	--	--	1.1E-01	9.0E-02	na

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	7.5E-01	--	--	--	--	--	--	7.5E-01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wastepool Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	5.3E+03	--	--	--	--	--	--	--	--	--	--	na	5.3E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	3.5E+02	--	--	--	--	--	--	--	--	--	--	na	3.5E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	--	--	na	1.3E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	2.5E-02	na	--	--	--	--	--	--	--	--	--	--	2.5E-02	na	--
Heptachlor <sup>C</sup>	0	5.2E-01	3.8E-03	na	7.9E-04	6.5E-01	9.5E-03	na	2.0E-03	--	--	--	--	--	--	--	--	6.5E-01	9.5E-03	na	2.0E-03
Heptachlor Epoxide <sup>C</sup>	0	5.2E-01	3.8E-03	na	3.9E-04	6.5E-01	9.5E-03	na	9.8E-04	--	--	--	--	--	--	--	--	6.5E-01	9.5E-03	na	9.8E-04
Hexachlorobenzene <sup>C</sup>	0	--	--	na	2.9E-03	--	--	na	7.3E-03	--	--	--	--	--	--	--	--	--	--	na	7.3E-03
Hexachlorobutadiene <sup>C</sup>	0	--	--	na	1.8E+02	--	--	na	4.5E+02	--	--	--	--	--	--	--	--	--	--	na	4.5E+02
Hexachlorocyclohexane	0	--	--	na	4.9E-02	--	--	na	1.2E-01	--	--	--	--	--	--	--	--	--	--	na	1.2E-01
Alpha-BHC <sup>C</sup>	0	--	--	na	1.7E-01	--	--	na	4.3E-01	--	--	--	--	--	--	--	--	--	--	na	4.3E-01
Hexachlorocyclohexane	0	9.5E-01	na	na	1.8E+00	1.2E+00	--	na	4.5E+00	--	--	--	--	--	--	--	--	1.2E+00	--	na	4.5E+00
Gamma-BHC <sup>C</sup> (Lindane)	0	--	--	na	1.1E+03	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	--	--	na	2.8E+03
Hexachlorocyclopentadiene	0	--	--	na	3.3E+01	--	--	na	8.3E+01	--	--	--	--	--	--	--	--	--	--	na	8.3E+01
Hexachloroethane <sup>C</sup>	0	--	2.0E+00	na	--	--	5.0E+00	na	--	--	--	--	--	--	--	--	--	--	5.0E+00	na	--
Hydrogen Sulfide	0	--	--	na	1.8E-01	--	--	na	4.5E-01	--	--	--	--	--	--	--	--	--	--	na	4.5E-01
Indeno (1,2,3-cd) pyrene <sup>C</sup>	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone <sup>C</sup>	0	--	--	na	9.6E+03	--	--	na	2.4E+04	--	--	--	--	--	--	--	--	--	--	na	2.4E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	2.0E+01	2.9E+00	na	--	2.5E+01	7.3E+00	na	--	--	--	--	--	--	--	--	--	2.5E+01	7.3E+00	na	--
Malathion	0	--	1.0E-01	na	--	--	2.5E-01	na	--	--	--	--	--	--	--	--	--	--	2.5E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	1.7E+00	1.9E+00	--	--	--	--	--	--	--	--	--	--	1.7E+00	1.9E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.8E+03	--	--	--	--	--	--	--	--	--	--	na	3.8E+03
Methylene Chloride <sup>C</sup>	0	--	--	na	5.9E+03	--	--	na	1.5E+04	--	--	--	--	--	--	--	--	--	--	na	1.5E+04
Methoxychlor	0	--	3.0E-02	na	--	--	7.5E-02	na	--	--	--	--	--	--	--	--	--	--	7.5E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	5.6E+01	7.3E+00	na	4.6E+03	7.0E+01	1.8E+01	na	1.2E+04	--	--	--	--	--	--	--	--	7.0E+01	1.8E+01	na	1.2E+04
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
N-Nitrosodimethylamine <sup>C</sup>	0	--	--	na	3.0E+01	--	--	na	7.5E+01	--	--	--	--	--	--	--	--	--	--	na	7.5E+01
N-Nitrosodiphenylamine <sup>C</sup>	0	--	--	na	6.0E+01	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	--	--	na	1.5E+02
N-Nitrosodi-n-propylamine <sup>C</sup>	0	--	--	na	5.1E+00	--	--	na	1.3E+01	--	--	--	--	--	--	--	--	--	--	na	1.3E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	3.5E+01	1.7E+01	na	--	--	--	--	--	--	--	--	--	3.5E+01	1.7E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	8.1E-02	3.3E-02	na	--	--	--	--	--	--	--	--	--	8.1E-02	3.3E-02	na	--
PCB Total <sup>C</sup>	0	--	1.4E-02	na	6.4E-04	--	3.5E-02	na	1.6E-03	--	--	--	--	--	--	--	--	--	3.5E-02	na	1.6E-03
Pentachlorophenol <sup>C</sup>	0	7.7E-03	5.9E-03	na	3.0E+01	9.6E-03	1.5E-02	na	7.5E+01	--	--	--	--	--	--	--	--	9.6E-03	1.5E-02	na	7.5E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	--	--	na	2.2E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	1.0E+04	--	--	--	--	--	--	--	--	--	--	na	1.0E+04
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	1.0E+01	--	--	--	--	--	--	--	--	--	--	na	1.0E+01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na
Uranium (ug/l)	0	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.5E+01	1.3E+01	na	1.1E+04	--	--	--	--	2.5E+01	1.3E+01	na
Silver	0	3.2E-01	--	na	--	4.0E-01	--	na	--	--	--	--	--	4.0E-01	--	na
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	na
1,1,2,2-Tetrachloroethane <sup>C</sup>	0	--	--	na	4.0E+01	--	--	na	1.0E+02	--	--	--	--	--	--	na
Tetrachloroethylene <sup>C</sup>	0	--	--	na	3.3E+01	--	--	na	8.3E+01	--	--	--	--	--	--	na
Thallium	0	--	--	na	4.7E-01	--	--	na	1.2E+00	--	--	--	--	--	--	na
Toluene	0	--	--	na	6.0E+03	--	--	na	1.5E+04	--	--	--	--	--	--	na
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	na
Toxaphene <sup>C</sup>	0	7.3E-01	2.0E-04	na	2.8E-03	9.1E-01	5.0E-04	na	7.0E-03	--	--	--	--	9.1E-01	5.0E-04	na
Tributyltin	0	4.6E-01	7.2E-02	na	--	5.7E-01	1.8E-01	na	--	--	--	--	--	5.7E-01	1.8E-01	na
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.8E+02	--	--	--	--	--	--	na
1,1,2-Trichloroethane <sup>C</sup>	0	--	--	na	1.6E+02	--	--	na	4.0E+02	--	--	--	--	--	--	na
Trichloroethylene <sup>C</sup>	0	--	--	na	3.0E+02	--	--	na	7.5E+02	--	--	--	--	--	--	na
2,4,6-Trichlorophenol <sup>C</sup>	0	--	--	na	2.4E+01	--	--	na	6.0E+01	--	--	--	--	--	--	na
2-(2,4,5-Trichlorophenoxy)propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	na
Vinyl Chloride <sup>C</sup>	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	na
Zinc	0	3.6E+01	4.3E+01	na	2.6E+04	4.5E+01	1.1E+02	na	6.5E+04	--	--	--	--	4.5E+01	1.1E+02	na

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.  
Antidegrad. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic  
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.6E+03
Arsenic	1.7E+02
Barium	na
Cadmium	4.1E-01
Chromium III	4.1E+01
Chromium VI	8.0E+00
Copper	1.8E+00
Iron	na
Lead	4.4E+00
Manganese	na
Mercury	7.0E-01
Nickel	1.1E+01
Selenium	7.5E+00
Silver	1.6E-01
Zinc	1.8E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

# FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Little Falls Run WWTP for all other parameters Permit No.: VA0076392

Receiving Stream: Rappahannock River

Version: OWP Guidance Memo 00-2011 (8/24/00)

*I don't understand the limits for effluent & stream - adjust the mix to fit on the*

Stream Information		Stream Flows		Mixing Inf		Effluent Information	
Mean Hardness (as CaCO <sub>3</sub> ) =	50 mg/L	1Q10 (Annual) =	1 MGD	Annual	-	Mean Hardness (as CaCO <sub>3</sub> ) =	mg/L
90% Temperature (Annual) =	27.5 deg C	7Q10 (Annual) =	1 MGD	-	-	90% Temp (Annual) =	27.5 deg C
90% Temperature (Wet season) =	deg C	30Q10 (Annual) =	1 MGD	-	-	90% Temp (Wet season) =	deg C
90% Maximum pH =	7.5 SU	1Q10 (Wet season) =	1 MGD	Wet Season - 1Q10	-	90% Maximum pH =	7.5 SU
10% Maximum pH =	SU	30Q10 (Wet season)	1 MGD	-	-	10% Maximum pH =	SU
Tier Designation (1 or 2) =	1	30Q5 =	1 MGD	-	-	Discharge Flow =	1 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	1 MGD	-	-		
Trout Present Y/N? =	n						
Early Life Stages Present Y/N? =	y						

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Acenaphthene	0	--	--	na	9.9E+02	--	--	na	2.0E+03	--	--	--	--	--	--	na
Acrolein	0	--	--	na	9.9E+00	--	--	na	1.9E+01	--	--	--	--	--	--	na
Acrylonitrile <sup>c</sup>	0	--	--	na	2.5E+00	--	--	na	5.0E+00	--	--	--	--	--	--	na
Aldrin <sup>c</sup>	0	3.0E+00	--	na	5.0E-04	3.5E+00	--	na	1.0E-03	--	--	--	--	3.5E+00	--	na
Ammonia-N (mg/l) (Yearly)	0	1.99E+01	1.89E+00	na	--	2.3E+01	3.8E+00	na	--	--	--	--	--	2.3E+01	3.8E+00	na
Ammonia-N (mg/l) (High Flow)	0	1.99E+01	4.36E+00	na	--	3.6E+01	8.7E+00	na	--	--	--	--	--	3.6E+01	8.7E+00	na
Anthracene	0	--	--	na	4.0E+04	--	--	na	8.0E+04	--	--	--	--	--	--	na
Antimony	0	--	--	na	6.4E+02	--	--	na	1.3E+03	--	--	--	--	--	--	na
Arsenic	0	3.4E+02	1.5E+02	na	--	4.0E+02	3.0E+02	na	--	--	--	--	--	4.0E+02	3.0E+02	na
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	na
Benzene <sup>c</sup>	0	--	--	na	5.1E+02	--	--	na	1.0E+03	--	--	--	--	--	--	na
Benzidine <sup>c</sup>	0	--	--	na	2.0E-03	--	--	na	4.0E-03	--	--	--	--	--	--	na
Benzo (a) anthracene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	na
Benzo (b) fluoranthene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	na
Benzo (k) fluoranthene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	na
Benzo (a) pyrene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	na
Bis(2-Chloroethyl) Ether <sup>c</sup>	0	--	--	na	5.3E+00	--	--	na	1.1E+01	--	--	--	--	--	--	na
Bis(2-Chloroisopropyl) Ether	0	--	--	na	6.5E+04	--	--	na	1.3E+05	--	--	--	--	--	--	na
Bis 2-Ethylhexyl Phthalate <sup>c</sup>	0	--	--	na	2.2E+01	--	--	na	4.4E+01	--	--	--	--	--	--	na
Bromoform <sup>c</sup>	0	--	--	na	1.4E+03	--	--	na	2.8E+03	--	--	--	--	--	--	na
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	3.8E+03	--	--	--	--	--	--	na
Cadmium	0	8.2E-01	3.8E-01	na	--	9.6E-01	7.6E-01	na	--	--	--	--	--	9.6E-01	7.6E-01	na
Carbon Tetrachloride <sup>c</sup>	0	--	--	na	1.6E+01	--	--	na	3.2E+01	--	--	--	--	--	--	na
Chlordane <sup>c</sup>	0	2.4E+00	4.3E-03	na	8.1E-03	2.8E+00	8.6E-03	na	1.6E-02	--	--	--	--	2.8E+00	8.6E-03	na
Chloride	0	8.6E+05	2.3E+05	na	--	1.0E+06	4.6E+05	na	--	--	--	--	--	1.0E+06	4.6E+05	na

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
TRC	0	1.9E+01	1.1E+01	na	--	2.2E+01	2.2E+01	na	--	--	--	--	--	2.2E+01	2.2E+01	na
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	3.2E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Chlorodibromomethane <sup>c</sup>	0	--	--	na	1.3E+02	--	--	na	2.6E+02	--	--	--	--	--	--	na
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.2E+04	--	--	--	--	--	--	na
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	na
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	na
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	9.7E-02	8.2E-02	na	--	--	--	--	--	9.7E-02	8.2E-02	na
Chromium III	0	1.8E+02	2.4E+01	na	--	2.1E+02	4.8E+01	na	--	--	--	--	--	2.1E+02	4.8E+01	na
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.9E+01	2.2E+01	na	--	--	--	--	--	1.9E+01	2.2E+01	na
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	na
Chrysene <sup>c</sup>	0	--	--	na	1.8E-02	--	--	na	3.6E-02	--	--	--	--	--	--	na
Copper	0	3.6E+00	2.7E+00	na	--	4.2E+00	5.5E+00	na	--	--	--	--	--	4.2E+00	5.5E+00	na
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.6E+01	1.0E+01	na	3.2E+04	--	--	--	--	2.6E+01	1.0E+01	na
DDD <sup>c</sup>	0	--	--	na	3.1E-03	--	--	na	6.2E-03	--	--	--	--	--	--	na
DDE <sup>c</sup>	0	--	--	na	2.2E-03	--	--	na	4.4E-03	--	--	--	--	--	--	na
DDT <sup>c</sup>	0	1.1E+00	1.0E-03	na	2.2E-03	1.3E+00	2.0E-03	na	4.4E-03	--	--	--	--	1.3E+00	2.0E-03	na
Demeton	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	2.0E-01	na
Diazinon	0	1.7E-01	1.7E-01	na	--	2.0E-01	3.4E-01	na	--	--	--	--	--	2.0E-01	3.4E-01	na
Dibenz(a,h)anthracene <sup>c</sup>	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	na
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.6E+03	--	--	--	--	--	--	na
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.9E+03	--	--	--	--	--	--	na
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.8E+02	--	--	--	--	--	--	na
3,3-Dichlorobenzidine <sup>c</sup>	0	--	--	na	2.8E-01	--	--	na	5.6E-01	--	--	--	--	--	--	na
Dichlorobromomethane <sup>c</sup>	0	--	--	na	1.7E+02	--	--	na	3.4E+02	--	--	--	--	--	--	na
1,2-Dichloroethane <sup>c</sup>	0	--	--	na	3.7E+02	--	--	na	7.4E+02	--	--	--	--	--	--	na
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.4E+04	--	--	--	--	--	--	na
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	na
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	5.8E+02	--	--	--	--	--	--	na
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	na
1,2-Dichloropropane <sup>c</sup>	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	na
1,3-Dichloropropene <sup>c</sup>	0	--	--	na	2.1E+02	--	--	na	4.2E+02	--	--	--	--	--	--	na
Dieldrin <sup>c</sup>	0	2.4E-01	5.6E-02	na	5.4E-04	2.8E-01	1.1E-01	na	1.1E-03	--	--	--	--	2.8E-01	1.1E-01	na
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	8.8E+04	--	--	--	--	--	--	na
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.7E+03	--	--	--	--	--	--	na
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.2E+06	--	--	--	--	--	--	na
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	9.0E+03	--	--	--	--	--	--	na
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	na
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.6E+02	--	--	--	--	--	--	na
2,4-Dinitrotoluene <sup>c</sup>	0	--	--	na	3.4E+01	--	--	na	6.8E+01	--	--	--	--	--	--	na
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.0E-07	--	--	--	--	--	--	na
1,2-Diphenylhydrazine <sup>c</sup>	0	--	--	na	2.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	na
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.6E-01	1.1E-01	na	1.8E+02	--	--	--	--	2.6E-01	1.1E-01	na
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.6E-01	1.1E-01	na	1.8E+02	--	--	--	--	2.6E-01	1.1E-01	na
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.6E-01	1.1E-01	--	--	--	--	--	--	2.6E-01	1.1E-01	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.8E+02	--	--	--	--	--	--	na
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.0E-01	7.2E-02	na	1.2E-01	--	--	--	--	1.0E-01	7.2E-02	na

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	6.0E-01	--	--	--	--	--	--	6.0E-01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	4.2E+03	--	--	--	--	--	--	--	--	--	--	na	4.2E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	na	2.8E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	2.0E-02	na	--	--	--	--	--	--	--	--	--	--	2.0E-02	na	--
Heptachlor <sup>C</sup>	0	5.2E-01	3.8E-03	na	7.9E-04	6.0E-01	7.6E-03	na	1.6E-03	--	--	--	--	--	--	--	--	6.0E-01	7.6E-03	na	1.6E-03
Heptachlor Epoxide <sup>C</sup>	0	5.2E-01	3.8E-03	na	3.9E-04	6.0E-01	7.6E-03	na	7.8E-04	--	--	--	--	--	--	--	--	6.0E-01	7.6E-03	na	7.8E-04
Hexachlorobenzene <sup>C</sup>	0	--	--	na	2.9E-03	--	--	na	5.8E-03	--	--	--	--	--	--	--	--	--	--	na	5.8E-03
Hexachlorobutadiene <sup>C</sup>	0	--	--	na	1.8E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.6E+02
Hexachlorocyclohexane	0	--	--	na	4.9E-02	--	--	na	9.8E-02	--	--	--	--	--	--	--	--	--	--	na	9.8E-02
Alpha-BHC <sup>C</sup>	0	--	--	na	1.7E-01	--	--	na	3.4E-01	--	--	--	--	--	--	--	--	--	--	na	3.4E-01
Hexachlorocyclohexane	0	9.5E-01	na	na	1.8E+00	1.1E+00	--	na	3.6E+00	--	--	--	--	--	--	--	--	1.1E+00	--	na	3.6E+00
Gamma-BHC <sup>C</sup> (Lindane)	0	--	--	na	1.1E+03	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	--	--	na	2.2E+03
Hexachlorocyclopentadiene	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Hexachloroethane <sup>C</sup>	0	--	2.0E+00	na	--	--	4.0E+00	na	--	--	--	--	--	--	--	--	--	--	4.0E+00	na	--
Hydrogen Sulfide	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Indeno (1,2,3-cd) pyrene <sup>C</sup>	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone <sup>C</sup>	0	--	--	na	9.6E+03	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	--	--	na	1.9E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	2.0E+01	2.3E+00	na	--	2.4E+01	4.6E+00	na	--	--	--	--	--	--	--	--	--	2.4E+01	4.6E+00	na	--
Malathion	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	1.6E+00	1.5E+00	--	--	--	--	--	--	--	--	--	--	1.6E+00	1.5E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	--	--	na	3.0E+03
Methylene Chloride <sup>C</sup>	0	--	--	na	5.9E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Methoxychlor	0	--	3.0E-02	na	--	--	6.0E-02	na	--	--	--	--	--	--	--	--	--	--	6.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	5.6E+01	6.3E+00	na	4.6E+03	6.6E+01	1.3E+01	na	9.2E+03	--	--	--	--	--	--	--	--	6.6E+01	1.3E+01	na	9.2E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
N-Nitrosodimethylamine <sup>C</sup>	0	--	--	na	3.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	--	--	na	6.0E+01
N-Nitrosodiphenylamine <sup>C</sup>	0	--	--	na	6.0E+01	--	--	na	1.2E+02	--	--	--	--	--	--	--	--	--	--	na	1.2E+02
N-Nitrosodi-n-propylamine <sup>C</sup>	0	--	--	na	5.1E+00	--	--	na	1.0E+01	--	--	--	--	--	--	--	--	--	--	na	1.0E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	3.3E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	3.3E+01	1.3E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	7.6E-02	2.6E-02	na	--	--	--	--	--	--	--	--	--	7.6E-02	2.6E-02	na	--
PCB Total <sup>C</sup>	0	--	1.4E-02	na	6.4E-04	--	2.8E-02	na	1.3E-03	--	--	--	--	--	--	--	--	--	2.8E-02	na	1.3E-03
Pentachlorophenol <sup>C</sup>	0	7.7E-03	5.9E-03	na	3.0E+01	8.9E-03	1.2E-02	na	6.0E+01	--	--	--	--	--	--	--	--	8.9E-03	1.2E-02	na	6.0E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	1.7E+06	--	--	--	--	--	--	--	--	--	--	na	1.7E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	--	--	na	8.0E+03
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
pCi/L	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
(mrem/yr)	0	--	--	na	4.0E+00	--	--	na	8.0E+00	--	--	--	--	--	--	--	--	--	--	na	8.0E+00

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	na
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	na

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.3E+01	1.0E+01	na	8.4E+03	--	--	--	--	2.3E+01	1.0E+01	na
Silver	0	3.2E-01	--	na	--	3.7E-01	--	na	--	--	--	--	--	3.7E-01	--	na
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	na
1,1,2,2-Tetrachloroethane <sup>C</sup>	0	--	--	na	4.0E+01	--	--	na	8.0E+01	--	--	--	--	--	--	na
Tetrachloroethylene <sup>C</sup>	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	na
Thallium	0	--	--	na	4.7E-01	--	--	na	9.4E-01	--	--	--	--	--	--	na
Toluene	0	--	--	na	6.0E+03	--	--	na	1.2E+04	--	--	--	--	--	--	na
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--
Toxaphene <sup>C</sup>	0	7.3E-01	2.0E-04	na	2.8E-03	8.5E-01	4.0E-04	na	5.6E-03	--	--	--	--	8.5E-01	4.0E-04	na
Tributyltin	0	4.6E-01	7.2E-02	na	--	5.4E-01	1.4E-01	na	--	--	--	--	--	5.4E-01	1.4E-01	na
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.4E+02	--	--	--	--	--	--	na
1,1,2-Trichloroethane <sup>C</sup>	0	--	--	na	1.6E+02	--	--	na	3.2E+02	--	--	--	--	--	--	na
Trichloroethylene <sup>C</sup>	0	--	--	na	3.0E+02	--	--	na	6.0E+02	--	--	--	--	--	--	na
2,4,6-Trichlorophenol <sup>C</sup>	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	na
2-(2,4,5-Trichlorophenoxy)propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	na
Vinyl Chloride <sup>C</sup>	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	na
Zinc	0	3.6E+01	3.6E+01	na	2.6E+04	4.2E+01	7.3E+01	na	5.2E+04	--	--	--	--	4.2E+01	7.3E+01	na

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 20 maximum for Industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.  
Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic  
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.3E+03
Arsenic	1.6E+02
Barium	na
Cadmium	3.8E-01
Chromium III	2.9E+01
Chromium VI	7.4E+00
Copper	1.7E+00
Iron	na
Lead	2.8E+00
Manganese	na
Mercury	6.5E-01
Nickel	7.5E+00
Selenium	6.0E+00
Silver	1.5E-01
Zinc	1.7E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Station_ID	Collection_Date	Field_pH	DO_Probe	Temp_Celsuis	Salinity
3-RPP104.	2/21/1991	6.6	11.3	8.6	0
3-RPP104.	3/12/1991	7.07	12.45	6.86	0
3-RPP104.	3/21/1991	6.3	6.7	10.4	0
3-RPP104.	4/1/1991	6.6	11	10.4	0
3-RPP104.	4/22/1991	6.68	10.24	12.82	0
3-RPP104.	4/30/1991	6.4	7.8	19.7	0
3-RPP104.	5/14/1991	6.3	6.8	24.8	0
3-RPP104.	6/11/1991	6	6.7	25.7	0
3-RPP104.	6/25/1991	6.2	7.2	24.2	0
3-RPP104.	7/11/1991	--	--	--	--
3-RPP104.	8/8/1991	6.3	5.8	28	0
3-RPP104.	8/22/1991	6.3	6.7	27.4	0
3-RPP104.	9/24/1991	6.3	6.8	23.2	0
3-RPP104.	10/8/1991	6.5	7	19.6	0
3-RPP104.	10/23/1991	6.4	7.9	14.9	0
3-RPP104.	11/7/1991	6.9	8	11.7	0
3-RPP104.	12/9/1991	6.3	11.3	6.4	0
3-RPP104.	1/7/1992	7.17	12.36	6.39	0
3-RPP104.	3/19/1992	7.2	11.3	6.9	0
3-RPP104.	4/16/1992	7.3	9.2	14.8	0
3-RPP104.	5/18/1992	7.3	7.9	20.2	0
3-RPP104.	6/2/1992	7.4	8.3	18.1	0
3-RPP104.	6/16/1992	7.6	7.4	24	0
3-RPP104.	6/30/1992	7.3	6.9	25.7	0
3-RPP104.	8/11/1992	7.2	6.9	26.7	--
3-RPP104.	8/11/1992	7.4	7.4	27.4	--
3-RPP104.	8/27/1992	7.5	7.8	27	0
3-RPP104.	9/10/1992	7.1	8.1	24.4	--
3-RPP104.	10/1/1992	7.3	9.7	16.3	0
3-RPP104.	10/13/1992	7.1	9.3	15.9	0
3-RPP104.	10/27/1992	7	10.1	12.1	0
3-RPP104.	11/12/1992	7	10.8	9.1	0
3-RPP104.	12/16/1992	6.5	11.9	5.1	0
3-RPP104.	1/19/1993	6.5	11.3	4.5	0
3-RPP104.	2/8/1993	7.1	11.2	2.7	--
3-RPP104.	2/8/1993	7	11.2	2.7	0
3-RPP104.	4/13/1993	6.5	11.1	11.3	0
3-RPP104.	4/20/1993	6.5	10.3	14.3	0
3-RPP104.	5/5/1993	6.6	8.3	19.8	0
3-RPP104.	5/20/1993	6.7	9.2	17	0
3-RPP104.	6/3/1993	7	8.3	21.6	0
3-RPP104.	6/21/1993	6.9	8	28.9	0
3-RPP104.	7/6/1993	6.4	6.9	29.2	0
3-RPP104.	7/20/1993	6.6	7.1	28.8	0
3-RPP104.	8/3/1993	6.6	6.7	27.7	0
3-RPP104.	8/18/1993	6.6	8.7	28.3	--
3-RPP104.	9/9/1993	6.5	6	27	--
3-RPP104.	9/21/1993	6.7	6.8	23	--
3-RPP104.	10/4/1993	6.98	8.89	18.55	0
3-RPP104.	12/1/1993	6.6	13.1	6.3	--
3-RPP104.	1/11/1994	6.7	15.3	0.8	0

3-RPP104.	3/15/1994	6.6	11.7	8.2	0
3-RPP104.	4/12/1994	6.7	9.9	13.9	0
3-RPP104.	5/10/1994	6.4	9.1	15.8	0
3-RPP104.	6/7/1994	7.3	8.7	25.3	0
3-RPP104.	7/5/1994	6.9	8.2	29.9	0
3-RPP104.	8/10/1994	7.6	8.7	25.6 --	
3-RPP104.	10/5/1994	7.1	8.8	17.7 --	
3-RPP104.	10/5/1994	7.1	8.8	17.9	0
3-RPP104.	11/15/1994	7.3	10.5	11	0
3-RPP104.	11/15/1994	7.3	10.3	11.1 --	
3-RPP104.	12/1/1994	7.2	11.7	6.9	0
3-RPP104.	12/1/1994	7.2	11.7	6.9	0
3-RPP104.	1/10/1995	6.8	13.6	2.1 --	
3-RPP104.	2/23/1995	7.4	12.2	5.8 --	
3-RPP104.	3/14/1995 --		11.9	9.7 --	
3-RPP104.	4/6/1995	6.5	10.5	11.6 --	
3-RPP104.	6/8/1995	7.3	7.3	25.1 --	
3-RPP104.	7/11/1995 --		7.1	25 --	
3-RPP104.	8/10/1995	5.6	8	25.1 --	
3-RPP104.	9/7/1995	7.3	7.9	25.9 --	
3-RPP104.	10/12/1995	7.2	8.5	19.8 --	
3-RPP104.	11/27/1995 --		12.8	4.8 --	
3-RPP104.	12/6/1995	7.1	12.2	6.4 --	
3-RPP104.	3/13/1996	8.4	14.5	5 --	
3-RPP104.	4/11/1996	7.5	11.8	8.7 --	
3-RPP104.	5/23/1996	7.4	7.9	25.6 --	
3-RPP104.	6/6/1996	8	9.1	23.5 --	
3-RPP104.	7/25/1996	7.3	7.9	25.6 --	
3-RPP104.	8/8/1996	7.2	7.3	26.6 --	
3-RPP104.	9/26/1996	6.4	8.8	19.1 --	
3-RPP104.	11/7/1996	7.3	11.9	11.1 --	
3-RPP104.	12/10/1996	7.2	13.9	4.3 --	
3-RPP104.	3/12/1997	7.3	11.3	9.4 --	
3-RPP104.	4/14/1997	7.8	8.2	13.3 --	
3-RPP104.	5/8/1997	7.5	8.8	18.7 --	
3-RPP104.	6/12/1997	7.2	9.1	22.8 --	
3-RPP104.	7/10/1997	6.8	7.3	28.2 --	
3-RPP104.	9/15/1997	7.5	7.7	23.1 --	
3-RPP104.	10/9/1997	7.5	8.5	20.9 --	
3-RPP104.	11/12/1997	7.1	11.8	9.9 --	
3-RPP104.	12/4/1997	7.3	13.5	5.9 --	
3-RPP104.	1/13/1998	7	12.9	6.3 --	
3-RPP104.	2/12/1998	7.5	11.9	6.2 --	
3-RPP104.	4/15/1998	7.5	10.2	14.2 --	
3-RPP104.	6/18/1998	7.2	8.6	22.8 --	
3-RPP104.	7/9/1998	6.9	7.5	26.8 --	
3-RPP104.	8/6/1998	6.9	7.8	27.5 --	
3-RPP104.	9/15/1998	8.3	10.5	25.8 --	
3-RPP104.	10/7/1998	7	5.4	20.1 --	
3-RPP104.	11/12/1998	7.2	9.9	10.8 --	
3-RPP104.	12/10/1998	7.3	9.9	12.1 --	
3-RPP104.	1/27/1999	6.9	12.6	6.3 --	

3-RPP104.	3/23/1999	6.8	10	8.4 --	
3-RPP104.	4/8/1999	6.6	9.6	16 --	
3-RPP104.	5/6/1999	6.8	9	18.8 --	
3-RPP104.	6/2/1999	7.5	10.7	25.3 --	
3-RPP104.	7/8/1999	7	9	30.2 --	
3-RPP104.	8/5/1999	6.8	8.7	29.3 --	
3-RPP104.	9/9/1999	6.6	6.9	26 --	
3-RPP104.	10/7/1999	6.8	9.5	16.1 --	
3-RPP104.	12/9/1999	7.5	15.1	7 --	
3-RPP104.	1/13/2000 --		13.1	5.2 --	
3-RPP104.	2/15/2000 --		14.2	3.8 --	
3-RPP104.	3/9/2000 --		11.5	12.2 --	
3-RPP104.	4/6/2000 --		10	14.1 --	
3-RPP104.	5/11/2000	7.5	6.1	25.5 --	
3-RPP104.	6/8/2000	7.3	7.3	22.3 --	
3-RPP104.	7/6/2000	7	6.5	26.3	0
3-RPP104.	8/10/2000	7	6.4	29	0
3-RPP104.	9/12/2000	6.81	5.48	26.55	0.03
3-RPP104.	10/12/2000	7.09	10.25	14.38	0.02
3-RPP104.	12/7/2000	7.25	13.2	2.58	0.03
3-RPP104.	3/15/2001	7.47	9.3	10.36	0.05
3-RPP104.	4/12/2001	7.2	10	16	0.03
3-RPP104.	5/10/2001	7.6	9	22.2 --	
3-RPP104.	8/14/2003	7	7.74	26.46	0.03
3-RPP104.	10/21/2003	7.55	10.42	14.48 --	
3-RPP104.	12/4/2003	6.88	13.12	4.1 --	
3-RPP104.	3/15/2004	8.26	11.4	8.88	0.03
3-RPP104.	5/6/2004	6.94	8.96	16.22	0.02
3-RPP104.	8/11/2004 --		7.77	26.35	0.04
3-RPP104.	11/17/2004	6.94	12.41	7.66 --	
3-RPP104.	1/12/2005	7.14	12.84	6.83	0.04
3-RPP104.	3/24/2005	7.17	11.38	9.15	0.04
3-RPP104.	5/12/2005	8.71	8.94	22.56 --	
3-RPP104.	7/7/2005	7.17	5.85	28.4	0
3-RPP104.	9/6/2005	7.3	7.22	26.4	0
3-RPP104.	11/1/2005	7.38	11.2	11.7	0.04
3-RPP104.	1/4/2006	7.38	13.41	5.4 --	
3-RPP104.	3/8/2006	7.7	12.8	8.1	0.04
3-RPP104.	4/5/2006	7.3	9.4	15.2 --	
3-RPP104.	6/20/2006	6.9	6	27.7 --	
3-RPP104.	8/9/2006	7.1	6.4	30.3	0.05
3-RPP104.	10/11/2006	7.2	9	16.9	0.03
3-RPP104.	12/12/2006	7.3	14.6	3.3	0.04
3-RPP104.	4/11/2007	7.9	11.8	10.7 --	
3-RPP104.	6/6/2007	7.1	7.6	26.2 --	
3-RPP104.	8/8/2007	7	7.1	30	0.06
3-RPP104.	10/10/2007	6.9	7.8	24.7	0.09
3-RPP104.	12/11/2007	7	12.3	5.3	0.06
3-RPP104.	4/8/2008	7	10.3	10.8	0.03

90th percentile values

7.5

27.5

3/26/2010 10:11:39 AM

Facility = Little Falls Run WWTP

Chemical = Ammonia as N

Chronic averaging period = 30

WLAa = 25

WLAc = 4.7

Q.L. = .2

# samples/mo. = 30

# samples/wk. = 8

#### Summary of Statistics:

# observations = 1

Expected Value = 9

Variance = 29.16

C.V. = 0.6

97th percentile daily values = 21.9007

97th percentile 4 day average = 14.9741

97th percentile 30 day average = 10.8544

# < Q.L. = 0

Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity

Maximum Daily Limit = 9.48304943905666

Average Weekly limit = 5.6566872202595

Average Monthly Limit = 4.7

The data are:

November 2, 2001

## MEMORANDUM

To: Little Falls Run WWTF 2001 Permit Modification File (VA0076392)

From: Anna T. Westernik

Subject: Staff Initiated Permit Modification of Metals Limits

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This memorandum and its attachments serve as a supplement to the April 14, 1999 Fact Sheet and as the documentation and rationale for a staff-initiated permit modification to the Little Falls Run WWTF permit. The modification removes the monitoring requirements and effluent limits for zinc. It was prompted by a change in the hardness value used to calculate the metals criteria and hence, the wasteload allocations and limits for the other major wastewater treatment plants located on the upper tidal portion of the Rappahannock River (the FMC, Massaponax, and Fredericksburg wastewater treatment facilities).

Reevaluation of the hardness data in the upper tidal portion of the Rappahannock River illustrates that the ambient data does not reflect the instream hardness value under design flow conditions (i.e., drought flows and the wastewater treatment plants discharging at design flow) (**Attachment 1**). The mean hardness of the river in the discharge area is approximately 29.5 mg/l. The average hardness of the Little Falls Run effluent calculated from three sets of Appendix A samples collected from September 1997 to September 1998 is 77.3 mg/l. As the quantity of flow from the wastewater treatment plants increases, it is intuitive that the instream hardness will begin to approach that of the effluent from the wastewater treatment plants. Staff does not feel it is feasible to perform an accurate mass balance between the wastewater treatment plants and the hardness of the river since multiple dischargers with different hardness values and uncertain mixing zones exist. Therefore, staff has chosen a hardness value of 50 mg/l, as recommended by guidance, to estimate the river hardness under design conditions.

### Current Zinc Limitations

The current permit for the Little Falls Run WWTF contains monthly average and weekly average zinc limits of 83.2  $\mu$ g/l. There is a compliance schedule for these limits in the permit. The deadline for achieving compliance with the final limits is November 18, 2003. An average instream hardness value of 29.5 mg/l derived from STORET data was used to determine the zinc criteria, wasteload allocation, and hence the limits (**Attachment 2**).

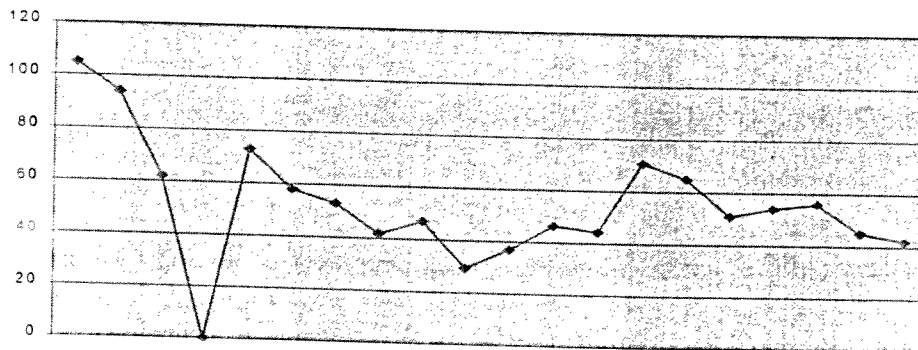
A 2:1 dilution was used in the November 18, 1999 permit reissuance to calculate both the acute and chronic wasteload allocations. DEQ Guidance Memorandum 00-2011 states that for surface discharges into tidal estuaries or estuarine embayments, the acute wasteload criteria (WLAa) should be set at 2 times the acute criteria because initial mixing in these circumstances is limited and lethality in the allocated impact zone must be prevented. Guidance also states that for surface discharges into tidal estuaries, estuarine embayments, or the open ocean, the chronic wasteload allocation (WLAc) should be based upon site-specific data on waste dispersion or dilution when available and appropriate. Where wastewater dispersion/dilution data are not available, a dilution rate of 50:1 may be used. Staff acknowledges that some dilution is occurring in the river; however, it is not appropriate to use a 50:1 dilution ratio to calculate WLAc for the following reasons:

1. There are four major wastewater treatment facilities that discharge into the upper tidal portion of the Rappahannock River. The combined effect of four major dischargers affects the mixing zone.
2. Since the dischargers are close to fall line, large tidal influences may not be realized.
3. The cumulative instream waste concentration of all dischargers is close to 50%, which has a similar effect on wasteload allocations as a 2:1 dilution factor.

## Reevaluation of the Current Zinc Limitations

The Department of Environmental Quality, Northern Virginia Regional Office (DEQ, NVRO) has reviewed dissolved zinc data collected monthly from outfall 001 of the Little Falls Run WWTF from December 1999 to July 2001. The zinc levels were higher when the sampling began then dropped and remained fairly constant (see Table 1). It appears that the zinc levels in the discharge decreased after the use of zinc orthophosphate in the water treatment system ceased.

**Table 1 - Little Falls Zinc Levels ( $\mu\text{g/l}$ )**  
 (Dec 99--Jul 01)



Date	Results ( $\mu\text{g/l}$ )
Dec-99	105
Jan-00	94
Feb-00	62
Mar-00	<20
Apr-00	73
May-00	58
Jun-00	53
Jul-00	41.9
Aug-00	47
Sep-00	29.5
Oct-00	37
Nov-00	46.4
Dec-00	44.3
Jan-01	70.8
Feb-01	65
Mar-01	51
Apr-01	54
May-01	56
Jun-01	45
Jul-01	42

Shaded area is below the limit of 83.2  $\mu\text{g/l}$  for zinc

The zinc limits were recalculated using criteria based on a hardness value of 50 mg/l, wasteload allocations derived using a 2:1 dilution, and the 20 data points shown in Table 1 (**Attachment 3**). Recalculation of the wasteload allocations using the revised criteria results in the removal of zinc limits from the permit (**Attachment 4**).

### Antidegradation

The State Water Control Board's Water Quality Standards (9 VAC 25-260-30) include an antidegradation policy. All state surface waters are provided one of three levels of antidegradation protection through the establishment of a waterbody tier. For Tier 1 (existing use protection), the existing use of the water body and the water quality necessary to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than water quality standards. Significantly lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulation. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

Staff has determined that the receiving waters, the Rappahannock River, are Tier 1 based on the following:

1. The waters are designated as nutrient enriched.
2. Chlorophyll a concentrations are high.
3. Antidegradation was not used in developing limits for the previous permit actions.
4. The Virginia Water Quality Assessment for 2000, 305(b) Report to Congress and EPA, reports one pH violation out of 56 sampling events at monitoring station 3-RPP104.47, 0.13 miles below outfall 001 of the Little Falls Run Wastewater Treatment Plant (**Attachment 5**).

For Tier 1 waters, antidegradation is addressed by ensuring that the effluent limits result in compliance with the water quality criteria. This permit modification will remove the limits for zinc. However, the water quality standards for zinc will not be violated at a hardness of 50 mg/l, which is presumed to exist at design flow conditions.

### Anti-Backsliding

According to EPA Region III guidance, if a permit limit is not in effect and a new reasonable potential analysis shows that the limit is no longer justified, the limit may be removed from the permit. The removal of the zinc limits in the Little Falls Run WWTF permit does not constitute backsliding because the zinc limits established in the November 18, 1999 permit reissuance have not become effective.

The removal of the zinc limits complies with Section 303(d)(4) of the Clean Water Act in that the zinc water quality criteria are being attained and the zinc limits are subject to and comply with antidegradation.

## LIST OF ATTACHMENTS

- Attachment 1 August 29, 2001 Memorandum Regarding Metals Limits in the FMC and Fredericksburg Wastewater Treatment Plant Permits
- Attachment 2 Fact Sheet from 1999 Permit Reissuance (NOT INCLUDED)
- Attachment 3 Metals Criteria and Zinc Limits
- Attachment 4 Effluent Limitations (NOT INCLUDED)
- Attachment 5 Excerpt from the 2000 305(b) Report (NOT INCLUDED)

8/29/01

Memorandum

To: VA006810 and VA0025127 Permit Files  
From: Tom Faha  
Subject: FMC STP and Fredericksburg STP VPDES Draft Permits

The purpose of this memo is to detail further considerations of the metal limits in the draft permits. Both permits have metal limits that have been challenged by the permittees. FMC has Cu and Zn limits. Fredericksburg has Zn limits.

One of the questions asked by the permittees concerned the hardness value that was used to derive permit limits. Specifically they asked why we did not use a mass balance between the STP effluents and the ambient river water. In considering this question, staff believes an alternate approach to deriving the hardness value is appropriate. The results of this approach is the recommendation of removing the Cu limit from the FMC permit and relaxing the Zn limits in both permits.

The following details the steps in the decision making process.

1. The metal limits were developed using a value of 30 mg/l for hardness to calculate the criteria.
2. The value of 30 mg/l was derived from ambient monitoring data for three water quality monitoring stations on the upper tidal portion of the Rappahannock River.
3. Staff did not use a mass balance between the STP effluents and the ambient data since the ambient samples inherently contained effluent.
4. However, staff has reevaluated the hardness data and recognize that the ambient data does not reflect what the instream hardness would be under design conditions; i.e. drought flows and STPs at design flow.
5. The average hardness of the effluent from the STPs ranges from 45 to 98 mg/l. The mean hardness of the river above the STPs is about 29 mg/l. It is intuitive that under design conditions the instream hardness will begin to approach that of the STP effluents.
6. Because of the multiple discharges and their different hardness values, and the uncertainty of the mixing zones, staff does not feel it is feasible perform an accurate mass balance between the STPs and background river hardness.
7. In lieu of estimating a mass balance, staff believes a value of 50 mg/l, as recommended in guidance, should adequately estimate the river hardness under design conditions.
8. Recalculating the Cu and Zn criteria using a hardness of 50 mg/l, recalculating the WLAs with the 2:1 dilution factor, and, running WLA.EXE yield the following:

	Criteria	WLA	Fredericksburg 97% value	FMC 97% value
Cu acute	9.2 ug/l	18.44	NA	19.13 ug/l
Cu chronic	6.54 ug/l	13.08	NA	13.08 ug/l
Zn acute	65.04 ug/l	130.08	166.86 ug/l	151.84 ug/l
Zn chronic	58.91 ug/l	117.82	114.08 ug/l	103.82 ug/l

Outputs from the WLA.EXE program are attached.

9. Based on the above results, staff recommends that the Zn limits in the draft permits be replaced with those in the attached sheets.
10. Staff recommends that Cu limits be removed from the FMC permit even though the predicted 97% daily value is greater than the acute WLA. The reasons for this are:
  - The closeness of the predicted value to the WLA, a difference of 0.69;
  - The WLA is calculated using a dilution factor of 2 that is based on professional judgement;
  - A dilution factor of 2.08 instead of 2 would yield no limit required; and
  - There were two data points used to predict the 97% value, 6.7 and 9.03 ug/l, and both were below the WLA.

A Cu monitoring requirement for a one-year period will be placed in the permit. Should the data clearly indicate the need for a Cu limit, the permit will be reopened and modified for inclusion of a limit.

CRITERIA (DISSOLVED), WLA, AND SSTV CALCULATIONS FOR METALS BASED UPON FRESHWATER CRITERIA (NONTIDAL ONLY)

Facility	FAC WWTF	(Last modified 8/4/99)	Acute IWC% = Chronic IWC% =	Chronic WLA (ug/l)	Chronic Criteria (ug/l)	SSTV = 0.4 X aWLA (ug/l)	Antideg Acute WLA (ug/l)	Antideg Chronic WLA (ug/l)	Antideg Chronic WLA (ug/l)	SSTV = 0.6 X cWLA (ug/l)	HH Surf H2O Criteria (ug/l)	HH Surf H2O WLA & SSTV (ug/l)	HH Surf H2O WLA & SSTV (ug/l)	HH PWS WLA & SSTV (ug/l)	HH PWS WLA & SSTV (ug/l)	Antideg HH PWS WLA & SSTV (ug/l)
Hardness	50.00 mg/l															
1Q10	0.00 MGD															
7Q10	0.00 MGD															
30Q5	0.00 MGD															
Harmon Mean	0.00 MGD															
Design Flow	0.00 MGD															
Water Body Tier	1															
Antimony																
Arsenic																
Arsenic III	360.00	#DIV/0!	NA	#DIV/0!	190.00	#DIV/0!				NA	#DIV/0!	4300	#DIV/0!	14.00	#DIV/0!	NA
Barium														50.00	#DIV/0!	NA
Cadmium (*)	1.79	#DIV/0!	NA	#DIV/0!	0.66	#DIV/0!				NA	#DIV/0!			2000.00	#DIV/0!	NA
Chromium III (*)	984.32	#DIV/0!	NA	#DIV/0!	117.32	#DIV/0!				NA	#DIV/0!					
Chromium VI	16.00	#DIV/0!	NA	#DIV/0!	11.00	#DIV/0!				NA	#DIV/0!					
Copper (*)	9.22	#DIV/0!	NA	#DIV/0!	6.54	#DIV/0!				NA	#DIV/0!					
Iron																
Lead (*)	49.21	#DIV/0!	NA	#DIV/0!	5.59	#DIV/0!				NA	#DIV/0!					
Manganese																
Mercury	2.40															
Nickel (*)	101.65	#DIV/0!	NA	#DIV/0!	0.012	#DIV/0!				NA	#DIV/0!			1300	#DIV/0!	NA
Selenium	20.00	#DIV/0!	NA	#DIV/0!	11.31	#DIV/0!				1.00	#DIV/0!	0.053	1.00	300	#DIV/0!	NA
Silver (*)	1.23	#DIV/0!	NA	#DIV/0!	5.00	#DIV/0!				NA	#DIV/0!	4600	#DIV/0!	15	#DIV/0!	NA
Zinc (*)	65.04	#DIV/0!	NA	#DIV/0!	58.91	#DIV/0!				NA	#DIV/0!	11000	#DIV/0!	50	#DIV/0!	NA
										NA	#DIV/0!			0.052	1.00	NA
										NA	#DIV/0!			610	#DIV/0!	1.00
										NA	#DIV/0!			170	#DIV/0!	NA
										NA	#DIV/0!			5000	#DIV/0!	NA

- NOTES: 1) THE ANTIDEGRADATION CALCULATIONS ARE BASED UPON AN ASSUMPTION THAT BACKGROUND CONDITIONS ARE ZERO.  
2) PICK MOST LIMITING SSTV FOR APPLICABLE SITUATION (I.E. PWS, NON PWS)  
3) BLANK SPACES UNDER CRITERIA COLUMNS INDICATE THAT NO CRITERIA EXISTS FOR THAT CATEGORY.  
4) MERCURY SSTV IS SET AT 1 UG/L PER AGENCY GUIDANCE REGARDLESS OF CRITERIA  
5) ACUTE CRITERIA/WLA BASED OFF OF 1Q10 FLOW; CHRONIC CRITERIA/WLA BASED OFF OF 7Q10 FLOW, HUMAN HEALTH CRITERIA BASED OFF OF 30Q5 FLOW.  
6) FOR HUMAN HEALTH CRITERIA, THERE IS NO SSTV CONVERSION FACTOR. THEREFORE, THE WLA AND SSTV ARE THE SAME.  
\* = THESE METALS ARE HARDNESS DEPENDENT.

8/29/01 11:23:24 AM

Facility = FMC WWTF  
Chemical = Copper  
Chronic averaging period = 4  
WLAa = 18.44  
WLAc = 13.08  
Q.L. = .2  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 2  
Expected Value = 7.865  
Variance = 22.2689  
C.V. = 0.6  
97th percentile daily values = 19.1388  
97th percentile 4 day average = 13.0857  
97th percentile 30 day average = 9.48560  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity  
Maximum Daily Limit = 18.44  
Average Weekly limit = 18.44  
Average Monthly Limit = 18.44

The data are:

6.7  
9.03

8/29/01 10:51:51 AM

Facility = FMC WWTF

Chemical = Zinc

Chronic averaging period = 4

WLAa = 130.08

WLAc = 117.82

C.L. = 1

# samples/mo. = 1

# samples/wk. = 1

#### Summary of Statistics:

# observations = 2

Expected Value = 62.4

Variance = 1401.75

C.V. = 0.6

97th percentile daily values = 151.845

97th percentile 4 day average = 103.820

97th percentile 30 day average = 75.2577

# < Q.L. = 0

Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity

Maximum Daily Limit = 130.08

Average Weekly limit = 130.08

Average Monthly Limit = 130.08

The data are:

76.9

47.9

**CRITERIA (DISSOLVED), WLA, AND SSTV CALCULATIONS FOR METALS BASED UPON FRESHWATER CRITERIA (NONTIDAL ONLY)**

Facility	Fredericksburg WWTF		(Last modified 8/4/99)		I:\water1\common\permits\unad\metals\metals.wb1									
	Hardness	50.00 mg/l	1Q10	0.00 MGD	Acute IWC% =	Chronic IWC% =	#DIV/0!	#DIV/0!						
7Q10		0.00 MGD												
30Q5		0.00 MGD												
Harmon Mean		0.00 MGD												
Design Flow		MGD												
Water Body Tier		1	(1=No Antideg, 2= Antideg)											
	Acute Criteria (ug/l)	Acute WLA (ug/l)	Antideg Acute WLA (ug/l)	SSTV = 0.4 X aWLA (ug/l)	Chronic Criteria (ug/l)	Chronic WLA (ug/l)	Antideg Chronic WLA (ug/l)	SSTV = 0.6 X cWLA (ug/l)	HH Surf H20 Criteria (ug/l)	HH Surf H20 WLA & SSTV (ug/l)	Antideg HH Surf H20 WLA & SSTV (ug/l)	HH PWS Criteria (ug/l)	HH PWS WLA & SSTV (ug/l)	Antideg HH PWS WLA & SSTV (ug/l)
Antimony														
Arsenic														
Arsenic III														
Barium	360.00	#DIV/0!		NA	190.00	#DIV/0!		NA	#DIV/0!	4300	#DIV/0!	14.00	#DIV/0!	NA
Cadmium (*)	1.79	#DIV/0!		NA	0.66	#DIV/0!		NA	#DIV/0!			50.00	#DIV/0!	NA
Chromium III (*)	984.32	#DIV/0!		NA	117.32	#DIV/0!		NA	#DIV/0!			2000.00	#DIV/0!	NA
Chromium VI	16.00	#DIV/0!		NA	11.00	#DIV/0!		NA	#DIV/0!					
Copper (*)	9.22	#DIV/0!		NA	6.54	#DIV/0!		NA	#DIV/0!					
Iron														
Lead (*)	49.21	#DIV/0!		NA	5.59	#DIV/0!		NA	#DIV/0!					
Manganese														
Mercury	2.40													
Nickel (*)	101.65	#DIV/0!		NA	0.012	#DIV/0!		NA	#DIV/0!	0.053	1.00			
Selenium	20.00	#DIV/0!		NA	11.31	#DIV/0!		NA	#DIV/0!	4600	#DIV/0!	0.052	1.00	NA
Silver (*)	1.23	#DIV/0!		NA	5.00	#DIV/0!		NA	#DIV/0!	11000	#DIV/0!	610	#DIV/0!	1.00
Zinc (*)	65.04	#DIV/0!		NA	58.91	#DIV/0!		NA	#DIV/0!			170	#DIV/0!	NA
								NA	#DIV/0!			5000	#DIV/0!	NA

NOTES: 1) THE ANTIDEGRADATION CALCULATIONS ARE BASED UPON AN ASSUMPTION THAT BACKGROUND CONDITIONS ARE ZERO.  
2) PICK MOST LIMITING SSTV FOR APPLICABLE SITUATION (I.E. PWS, NON PWS)  
3) BLANK SPACES UNDER CRITERIA COLUMNS INDICATE THAT NO CRITERIA EXISTS FOR THAT CATEGORY.  
4) MERCURY SSTV IS SET AT 1 UG/L PER AGENCY GUIDANCE REGARDLESS OF CRITERIA  
5) ACUTE CRITERIA/WLA BASED OFF OF 1Q10 FLOW; CHRONIC CRITERIA/WLA BASED OFF OF 7Q10 FLOW; HUMAN HEALTH CRITERIA BASED OFF OF 30Q5 FLOW.  
6) FOR HUMAN HEALTH CRITERIA, THERE IS NO SSTV CONVERSION FACTOR. THEREFORE, THE WLA AND SSTV ARE THE SAME.  
\* = THESE METALS ARE HARDNESS DEPENDENT.

8/29/01 10:53:20 AM

Facility = Fredericksburg WWTF

Chemical = Zinc

Chronic averaging period = 4

WLAa = 130.08

WLAc = 117.82

Q.L. = 5

# samples/mo. = 1

# samples/wk. = 1

#### Summary of Statistics:

# observations = 7

Expected Value = 68.5714

Variance = 1692.73

C.V. = 0.6

97th percentile daily values = 166.862

97th percentile 4 day average = 114.088

97th percentile 30 day average = 82.7007

# < Q.L. = 0

Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity

Maximum Daily Limit = 130.08

Average Weekly limit = 130.08

Average Monthly Limit = 130.08

The data are:

49

57

64

98

72

66

74

CRITERIA (DISSOLVED), WLA, AND SSTV CALCULATIONS FOR METALS BASED UPON FRESHWATER CRITERIA (NONTIDAL ONLY)

Facility	Little Falls Run WWTF		(Last modified 8/4/99)		i:\wdr1\common\permits\unode\metals\metals.wb1													
	Hardness	50.00 mg/l	Acute IWC% =	#DIV/0!	Chronic IWC% =	#DIV/0!	Chronic Criteria (ug/l)	Chronic WLA (ug/l)	Antideg Chronic WLA (ug/l)	SSTV = 0.4 X aWLA (ug/l)	Antideg Acute WLA (ug/l)	HH Surf H2O Criteria (ug/l)	HH Surf H2O WLA & SSTV (ug/l)	HH Surf H2O WLA & SSTV (ug/l)	HH PWS Criteria (ug/l)	HH PWS WLA & SSTV (ug/l)	Antideg HH PWS WLA & SSTV (ug/l)	
1Q10		0.00 MGD																
7Q10		0.00 MGD																
30Q5		0.00 MGD																
Harmon Mean		0.00 MGD																
Design Flow		MGD																
Water Body Tier		1	(1=No Antideg, 2= Antideg)															
Antimony																		
Arsenic		360.00	#DIV/0!	NA	#DIV/0!	190.00	#DIV/0!	NA	#DIV/0!				4300	#DIV/0!	NA	14.00	#DIV/0!	NA
Arsenic III																50.00	#DIV/0!	NA
Barium																		
Cadmium (*)		1.79	#DIV/0!	NA	#DIV/0!	0.66	#DIV/0!	NA	#DIV/0!							2000.00	#DIV/0!	NA
Chromium III (*)		984.32	#DIV/0!	NA	#DIV/0!	117.32	#DIV/0!	NA	#DIV/0!									
Chromium VI		16.00	#DIV/0!	NA	#DIV/0!	11.00	#DIV/0!	NA	#DIV/0!									
Copper (*)		9.22	#DIV/0!	NA	#DIV/0!	6.54	#DIV/0!	NA	#DIV/0!									
Iron																		
Lead (*)		49.21	#DIV/0!	NA	#DIV/0!	5.59	#DIV/0!	NA	#DIV/0!							1300	#DIV/0!	NA
Manganese																300	#DIV/0!	NA
Mercury		2.40														15	#DIV/0!	NA
Nickel (*)		101.65	#DIV/0!	NA	#DIV/0!	0.012	#DIV/0!	NA	#DIV/0!							50	#DIV/0!	NA
Selenium		20.00	#DIV/0!	NA	#DIV/0!	11.31	#DIV/0!	NA	#DIV/0!							0.052	1.00	NA
Silver (*)		1.23	#DIV/0!	NA	#DIV/0!	5.00	#DIV/0!	NA	#DIV/0!							610	#DIV/0!	1.00
Zinc (*)		65.04	#DIV/0!	NA	#DIV/0!	58.91	#DIV/0!	NA	#DIV/0!							170	#DIV/0!	NA
																5000	#DIV/0!	NA

NOTES: 1) THE ANTI-DEGRADATION CALCULATIONS ARE BASED UPON AN ASSUMPTION THAT BACKGROUND CONDITIONS ARE ZERO.  
2) PICK MOST LIMITING SSTV FOR APPLICABLE SITUATION (I.E. PWS, NON PWS)  
3) BLANK SPACES UNDER CRITERIA COLUMNS INDICATE THAT NO CRITERIA EXISTS FOR THAT CATEGORY  
4) MERCURY SSTV IS SET AT 1 UG/L PER AGENCY GUIDANCE REGARDLESS OF CRITERIA  
5) ACUTE CRITERIA/WLA BASED OFF OF 1010 FLOW. CHRONIC CRITERIA/WLA BASED OFF OF 7010 FLOW. HUMAN HEALTH CRITERIA BASED OFF OF 30Q5 FLOW  
6) FOR HUMAN HEALTH CRITERIA, THERE IS NO SSTV CONVERSION FACTOR. THEREFORE, THE WLA AND SSTV ARE THE SAME.  
\* = THESE METALS ARE HARDNESS DEPENDENT

10/24/01 4:15:30 PM

Facility = Little Falls Run WWTF

Chemical = Zinc (DMR Data)

Chronic averaging period = 4

WLAa = 130.08

WLAc = 117.82

Q.L. = 20

# samples/mo. = 1

# samples/wk. = 1

#### Summary of Statistics:

# observations = 20

Expected Value = 54.7902

Variance = 370.569

C.V. = 0.351343

97th percentile daily values = 96.6582

97th percentile 4 day average = 74.9062

97th percentile 30 day average = 61.4011

# < Q.L. = 1

Model used = delta lognormal

No Limit is required for this material

The data are:

105

94

62

0

73

58

53

41.9

47

29.5

37

46.4

44.3

70.8

65

51

54

56

45

42

March 2010  
**MEMORANDUM**

TO: Virginia Institute of Marine Science (VIMS) Model for the Tidal Rappahannock File

FROM: Alison Thompson, Water Permitting - NRO

SUBJECT: Virginia Institute of Marine Science Model for the Tidal Rappahannock.  
Input Assumptions and Summaries through December 2009

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This memo summarizes all of the VIMS model inputs, assumptions, and results made to date, documenting the use of and decisions reached with the model.

The last major update to the inputs to the model was dated January 2005. It was the model run for the expansion of the Little Falls Run STP from 8.0 MGD to 13.0 MGD. In addition, staff made changes to the VIMS point source inputs due to the regulatory initiatives regarding nutrient loadings to the Chesapeake Bay. This analysis accounted for the status of the nutrient regulations in January 2005. In August 2006, staff did a correction to the model for the Fredericksburg STP flow used for the nutrient loadings. The most recent work, and the basis for this January 2010 memorandum, was done because DEQ received a modification request from Spotsylvania County to move 1.4 MGD flow from FMC to the Massaponax STP.

### **Background**

Stafford County, Spotsylvania County, and the City of Fredericksburg funded a water quality model for the upper Rappahannock River estuary developed by the Virginia Institute of Marine Science (VIMS), entitled *A Modeling Study of the Water Quality of the Upper Rappahannock River (VIMS Model)*. This model was approved by the State Water Control Board Director on December 6, 1991. This model is used to determine effluent limitations for new and expanded discharge requests in the upper Rappahannock River, from the fall line at Fredericksburg to the Rt. 301 Bridge in King George County. VIMS documentation of the model is contained in *A Modeling Study of the Water Quality of the Upper Rappahannock River*, October 1991. A copy of the report as well as the program and general correspondence is contained in the Department of Environmental Quality (DEQ) Northern Regional Office (NRO) Rappahannock Model File.

There are 32 river miles between the fall line and the Rt. 301 Bridge. The model divides this 32 mile segment of the river into 33 model segments (see Figure 1 for discharger locations). The following point source discharges are included in the current model run:

Segment 3:	Fredericksburg STP	VA0025127	4.5 MGD
Segment 4:	FMC WWTP	VA0068110	4.0 MGD
Segment 9:	Little Falls Run STP	VA0076392	13.0 MGD
	Massaponax STP	VA0025658	9.4 MGD
Segment 20:	Four Winds Campground	VA0060429	0.210 MGD
Segment 23:	Hopyard Farm WWTP	VA0089338	0.50 MGD
Segment 26:	Haymount STP	VA0089125	0.96 MGD

### **Regulations affecting the VIMS model inputs**

The 2008 303(d)/305(b) Integrated Report (2008 IR) indicates that the tidal, freshwater portion of the Rappahannock River (which encompasses the entire extent of this model) is impaired for not meeting the aquatic life use due to low levels of dissolved oxygen. Specifically, an open water assessment of dissolved oxygen values during the summer season showed that the tidal, freshwater Rappahannock River (RPPTF) does not meet water quality standards. The total maximum daily load (TMDL) for this impairment is due by 2010, as part of the Chesapeake Bay wide TMDL to address excess nutrients and sediment affecting the Bay.

In addition, the 2008 IR also listed the tidal, freshwater Rappahannock River as impaired for not meeting the fish consumption use, due to elevated levels of Polychlorinated Biphenyls (PCBs) in fish tissue. The Virginia Department of Health issued a fish consumption advisory for the Rappahannock River below the fall line that limits American eel, blue catfish, carp, channel catfish, croaker, gizzard shad, and anadromous (coastal) striped bass consumption to no more than two meals per month. The affected area extends from the I-95 bridge above Fredericksburg downstream to the mouth of the river near Stingray Point, including its tributaries Hazel Run up to the I-95 bridge crossing and Claiborne Run up to the Route 1 bridge crossing. The TMDL study for this impairment is due by 2016.

Finally, the tidal, freshwater Rappahannock River, from the Route 1 bridge in Fredericksburg, downstream to the confluence with Mill Creek (near the Route 301 bridge crossing) is listed as impaired for not supporting the recreational use due to exceedances of the *E. coli* bacteria criterion. A TMDL was developed for the bacteria impairment in 2007-2008. The TMDL was approved by EPA on 05/05/2008.

As of the drafting of this memo, the preliminary 2010 303(d)/305(b) Integrated Assessment indicates that the open-water aquatic life sub-use (assessed using dissolved oxygen data) for the tidal, freshwater Rappahannock River is fully supporting. There is insufficient information to determine if the aquatic life sub-use for migratory fish spawning and nursery is being met; thus, the overall aquatic life use is also listed as having insufficient information to make an assessment.

Virginia has committed to protecting and restoring the Bay and its tributaries. Currently the Agency has developed nutrient water quality standards for the Bay and its tributaries, amended the Nutrient Policy (9 VAC 25-40-10) to govern the inclusion of technology-based, numerical nitrogen and phosphorus limits in VPDES permits, and a parallel effort updating and amending the Water Quality Management Planning (WQMP) regulation 9 VAC 25-720. The Water Quality Standards for the Bay were adopted in March 2005. The WQMP regulation includes Total Nitrogen and Total Phosphorus Wasteload Allocations for all Chesapeake Bay Program Significant Discharge List (CBP SDL) discharges.

The total phosphorous loadings based on the Nutrient Policy and/or from the WQMP for the applicable facilities are as follows:

Fredericksburg STP (4.5 MGD; 0.3 mg/L)	4,111 lb/year
FMC WWTP (5.4 MGD; 0.3 mg/L)	4,934 lb/year
Little Falls Run STP (8.0 MGD; 0.3 mg/L)	7,309 lb/year
Massaponax STP (8.0 MGD; 0.3 mg/L)	7,309 lb/year
Four Winds Campground (0.21 MGD)	640 lb/year. Not in the WQMP, but must meet 1.0 mg/L annual average
Haymount STP (0.96 MGD; 0.3 mg/L)	877 lb/year
Hopyard Farm WWTP (0.5 MGD; 0.3 mg/L)	457 lb/year

The total nitrogen loadings based on the Nutrient Policy and from the WQMP for the applicable facilities are as follows:

Fredericksburg STP (4.5 MGD; 4.0 mg/L)	54,819 lb/year
FMC WWTP (5.4 MGD; 4.0 mg/L)	65,784 lb/year
Little Falls Run STP (8.0 MGD; 4.0 mg/L)	97,458 lb/year
Massaponax STP (8.0 MGD; 4.0 mg/L)	97,458 lb/year
Four Winds Campground (0.21 MGD)	5100 lb/year. Not in the WQMP, but must meet 8.0 mg/L annual average

Haymount STP (0.96 MGD; 4.0 mg/L) 11,695 lb/year

Hopyard Farm WWTP (0.5 MGD; 4.0 mg/L) 6091 lb/year.

In addition to the nutrient initiatives, the changes to the Water Quality Standards for the Chesapeake Bay and tidal waters included criteria for dissolved oxygen, water clarity, chlorophyll a, and Designated Uses. The dissolved oxygen standard for migratory fish waters for the months of February through May is a 7-day mean of greater than or equal to 6.0 mg/L. For the months of June through January, the minimum is 5.5 mg/L. These dissolved oxygen criteria apply to the upper tidal portion of the Rappahannock River.

## RADCO 208 Plan

The Rappahannock Area Development Commission (RADCO) 208 Area Waste Treatment Management Plan was adopted in August 1977, was amended in September 1983, and was repealed in 2004. The loading allocations in it had to be maintained until the Plan was repealed. The loading allocations in the Plan were based on an old water quality model, AUTO\$\$, that was replaced in 1991 by the VIMS model.

The VIMS model has demonstrated that nutrients are the primary factor for water quality in the upper tidal Rappahannock River. Numerous runs of the model have demonstrated that cBOD is not as influential as the nutrients at the maximum permitted flows of each POTW. As such, cBOD loadings are permissible above the levels specified in the old RADCO Plan.

## Model Timeline

To date the model has been run seven times, each being necessitated by a request for a flow increase or for a new discharge. The runs are as follows:

1. August 14, 1995 - expansion of Fredericksburg STP from 3.5 to 4.5 MGD  
- addition of 0.93 MGD Haymount STP in Caroline County
2. August 22, 1996 - addition of 0.25 MGD Hopyard Farm WWTP in King George County
3. March 17, 1997 - flow increase and production increase at White Packing
4. April 7, 1999 - expansion of Little Falls Run STP from 4.0 to 8.0 MGD  
- expansion of Massaponax STP from 6.0 to 8.0 MGD
5. December 1, 2000 - expansion of FMC WWTP from 4.0 to 5.4 MGD
6. April 29, 2003 - expansion of the proposed Hopyard Farm WWTP from 0.25 to 0.50 MGD.
7. January 26, 2005 -remove White Packing from Segment 26 since the facility is closed  
-correction of Haymount STP flow to 0.96 (previously was 0.93)  
-addition of 1.0-MGD Greenhost – Village Farms in King George County  
-expansion of Little Falls Run STP from 8.0 to 13.0 MGD  
-incorporation of the WQMP nutrient loadings for the Significant Dischargers
8. August 2006 - correct nutrient loadings for the City of Fredericksburg
9. December 2009 - shift 1.4 MGD flow from FMC to Massaponax (will now be 9.4 MGD)  
- update of the nitrogen species based on the data obtained from Monitoring Reports.

The initial run of the VIMS files for the subsequent model runs were affected by the changes in the loadings for a distribution of (Nitrate+Nitrite). The January 2010 run looked at actual performance data from the four largest facilities and found

*Should that be Dec 2009*

considered the background condition for the river segments. The supporting documentation for the original model inputs and the output of the model, all parameters had been kept constant except those that changed. The most recent model runs affected a change to the nutrient loadings. In the most recent model runs, staff used best professional judgment to determine the loading for Nitrogen, Total Kjeldahl Nitrogen, and Oxidized Nitrogen based on actual performance data from the four largest facilities and found

that the old assumptions were not correct. The old assumptions were Ammonia as Nitrogen (25%), Total Kjeldahl Nitrogen (25%), and Oxidized Nitrogen (50%). The actual performance data from these larger facilities is Ammonia as Nitrogen (3%), Total Kjeldahl Nitrogen (37%), and Oxidized Nitrogen (60%).

### **Antidegradation Analysis**

With each running of the model, and/or permit action concerning this section of the Rappahannock River, an antidegradation analysis has been conducted in accordance with the water quality standards and DEQ guidance. This is a difficult task since the assessment and designation of Tier I or Tier II waters is partially subjective given the narrative criteria of the standards, water quality data are not static, and waterbody boundaries are not well defined.

Since the onset of using this model, the established model segments have been used, by default, to define river sections into individual waterbodies for the antidegradation analysis. DEQ did not suggest or contend that these model segments should be used for other water quality management purposes. It was recognized that the river from the fall line down to the Rt. 301 Bridge could have been, and perhaps should have been, considered one waterbody segment. DEQ also acknowledged that this whole segment of the Rappahannock River could have been assessed as Tier I since it is considered nutrient enriched and turbid and therefore subject to corrective plans outlined in the *1999 Tributary Strategy for the Rappahannock River and Northern Neck Coastal Basins*. However, being uncertain DEQ elected to evaluate antidegradation, as through each of the model segments were actual distinct waterbodies. This approach was conservative in terms of protecting water quality and to date did not prove to be an undo burden to any of the dischargers.

Historically, four segments were identified as Tier II through this process: segment 16, segment 20, segment 23, and segment 26. Each was identified through separate permit actions that did not initially involve the VIMS model. When a segment was analyzed as Tier II, two parameters generally were assessed, ammonia and dissolved oxygen (DO). Ammonia levels were kept below the baselines and DO was kept to no lower than 0.2 mg/L of the concentration predicted in the August 14, 1995 background model run. The VIMS memo dated April 29, 2003 contains the historical summary and table of the baselines of the Tier determinations for each of the four segments.

During the January 2005 model run analysis, the entire Rappahannock River was determined to be Tier I. The previous determination of Tier II ratings for segments 16, 20, 23, and 26 were made with adherence to guidance with little best professional judgement by staff. It has been 10 years since the initial runs of the model and staff no longer believes it appropriate to assign a tier rating for each model segment. Staff believes it is best to rate the whole segment from the fall line to the Route 301 bridge as one segment. The nutrient enrichment problems of this segment, as evident by high turbidity, warrants a Tier I rating. Staff again makes this determination for the sole purpose of assigning permit limits. And since the Tier ratings have had very little influence on the results of the model, there is no measurable consequence to this change, and there is no need to continue to assess these segments (16, 20, 23, and 26) as being different from the whole river segment.

It should be noted that the predicted concentrations of dissolved oxygen and ammonia are significantly different in this current model run than what was considered the "background" concentrations. With the new loading allocations to the significant discharges in place, the model predicts that chlorophyll concentrations will be significantly less than what prior model runs have predicted and the artificially elevated levels of dissolved oxygen (nutrients stimulate chlorophyll growth and chlorophyll photosynthesis generates dissolved oxygen) are no longer predicted. Further discussion of chlorophyll a is found in the next section.

### **Total Phosphorus Loading Cap (historical perspective)**

All of the above facilities discharge into the tidal freshwater Rappahannock River. This section of the river was formerly designated as nutrient enriched waters. Specifically, the Tidal freshwater Rappahannock River from the fall line to Buoy 44 near Leedstown, Virginia, including all tributaries to their headwaters that enter the tidal freshwater Rappahannock River were classified as nutrient enriched waters. All dischargers into nutrient enriched waters as designated in the Water Quality Standards for Nutrient Enriched Waters that were permitted before July 1, 1988, and that discharge 1 MGD or more were subject to the Policy for Nutrient Enriched Waters. This policy required facilities to meet a monthly average Total Phosphorus limitations of 2.0 mg/L and to monitor for monthly average Total Nitrogen concentration and loading values. The application of standards to protect nutrient enriched waters within the Chesapeake Bay watershed was replaced in Virginia by the aforementioned regulatory programs governing nutrient and sediment inputs into the Bay. Thus, the nutrient enriched waters designation was removed from the Water Quality Standards.

Based on the prior VIMS model runs, the chlorophyll a levels in the upper segments of the river in the Fredericksburg area approached 100 ug/L under design conditions. It is staff's best professional judgment that high chlorophyll a concentrations and the corresponding high alga growth mask dissolved oxygen depletion due to BOD loading. The model provides a 30-day average output and it is hypothesized that the elevating effect of the chlorophyll concentrations is more significant than the depleting effect of the BOD loadings. If the model provided daily outputs as you could see the diurnal dissolved oxygen sag and super-saturation effects in an over-enriched system. Further, the model demonstrated that chlorophyll a concentrations increased with additional phosphorus (P) loadings. If P limits for the expanding STPs were based solely on the Nutrient Policy, 2 mg/L, then chlorophyll a levels would exceed 120 ug/L in the waters around the City of Fredericksburg. To prevent further increases in chlorophyll a concentrations in this part of the river, total phosphorus loadings (mass based, kg/day) were not allowed to increase for the Fredericksburg, FMC, Massaponax, and Little Falls Run wastewater treatment plants beyond the current limits. All future requests for flow increases at these facilities required that the P mass limits remain constant at the current loading limits. Permitted phosphorus concentration limits may remain at the same level prescribed by the Nutrient Policy, 2 mg/L, since it is the total mass loading that impacts chlorophyll levels. However, as effluent flows increase, in order to meet the mass limitations, effluent concentrations had to be below the 2 mg/L limit.

The relationship of how chlorophyll photosynthesis affects dissolved oxygen levels has been explored in this model and it was worth recognizing what historical baseline/initial levels were. These values were useful in the subsequent model runs for tracking how nutrients inflated dissolved oxygen levels (nutrients stimulate chlorophyll growth and chlorophyll photosynthesis generates dissolved oxygen).

DEQ has adopted a chlorophyll a narrative standard at 9VAC25-260-185 that states, "Concentrations of chlorophyll a in free-floating microscopic aquatic plants (algae) shall not exceed levels that result in undesirable or nuisance aquatic plant life, or render tidal waters unsuitable for the propagation and growth of a balanced, indigenous population of aquatic life or otherwise result in ecologically undesirable water quality conditions such as reduced water clarity, low dissolved oxygen, food supply imbalances, proliferation of species deemed potentially harmful to aquatic life or humans or aesthetically objectionable conditions."

### **Summary of past model runs**

In the 1995 VIMS model, the winter inputs for ammonia and organic nitrogen for all wastewater treatment plants were 14 mg/L ammonia and 14 mg/L organic nitrogen. These values represented little to no nitrification. The model indicated that there were no far field violations of the winter ammonia standards. Therefore, no winter ammonia or TKN limits were established for Fredericksburg, FMC, Massaponax, and Little Falls Run wastewater treatment plants. The acute ammonia criterion for the winter months was 12.07 mg/L. DEQ did not impose winter acute based ammonia limits on any of the treatment plants for the following reasons: the discharges are located near the fall line where tidal influences are the smallest; the net advective flow of the river dominates the tidal influence; the design flows are much smaller than the critical flows of the river; ammonia decays rather rapidly; and each of the plants were achieving varying degrees of nitrification.

During the April 7, 1999 model run, winter ammonia loading had to be lowered for Little Falls Run and Massaponax from 14 mg/L to 12 mg/L in order to meet the antidegradation baselines in segment 23 and 26. Since organic nitrogen would also decrease during the nitrification process, its input into the model was also lowered to 12 mg/L for both dischargers. During this model run, the winter ammonia loadings for FMC were also lowered to 12 mg/L to meet the antidegradation baselines of segments 16, 23, and 26. At the new flows for FMC, water quality criteria and antidegradation baselines are still protective for the summer months of May – October. Since organic nitrogen would also decrease during the nitrification process, its input into the model was also lowered to 12 mg/L for FMC. Acute based ammonia limits were imposed at the new flows for the same reasons cited above. However, since the new model inputs were lower than the acute ammonia water quality standard of 12.07 mg/L, it was certain that the acute standard was protected in the winter.

In the December 1, 2000 model run, two minor data entry problems were corrected in conjunction with the expansion of FMC to 5.4 MGD. First, in the original model documentation memorandum of August 14, 1995, the assumption was made that total effluent nitrogen levels for these types of plants would be 30 mg/L, and that it would exist in the form of organic nitrogen, ammonia, and/or inorganic nitrogen depending on the facility's ability to nitrify. This can be seen on page 1 under the section "Assumptions for nitrogen". However, the value shown for the three separate nitrogen parts add up to 32 mg/L. It was felt that this was a simple oversight at the time. Additionally, during the April 7, 1999 model run, nitrate-nitrite levels were increased to 21 mg/L and 24 mg/L for

the Little Falls Run and Massaponax dischargers respectively, even though the ammonia nitrogen levels were set at 12 mg/L. Therefore, in order to maintain the original model assumptions, winter nitrate input levels were reset to 6 mg/L during this run for Little Falls Run, Massaponax, and FMC. Since the Fredericksburg inputs had not been adjusted, nor had they recently been adjusted, the original values were maintained (14 mg/L organic-N, 14 mg/L Ammonia-N, and 4 mg/L Nitrate/Nitrite). Second, the ammonia loadings for the Haymount STP were incorrectly entered as 8.61 kg/d. The correct loading was entered as 3.53 kg/d. This correction had little to no impact on the model outputs.

In the April 29, 2003, model run all numerical criteria were met and all antidegradation baselines for ammonia and DO were met except for one. In the winter run, segment 23 (Hopyard Farm) yielded a DO of 7.43 mg/L. The baseline for DO in this segment is 7.47 mg/L. In order to maintain the additional 0.04 mg/L of DO, the BOD concentrations of Hopyard Farm and the upstream dischargers would have to be significantly reduced. DEQ did not believe this reduction was warranted since the model was run based on design capacity flows for all facilities and not just for Hopyard Farm. In addition, the DO deficit for segment 23 actually improved from 0.07 mg/L to 0.04 mg/L with the increase in Hopyard Farm's flows. Therefore, changes to the effluent limits were not necessary for such a small change in DO since the model is not that sensitive or accurate.

In January 2005, the model run was conducted to include the expansion of the Little Falls Run STP, the removal of White Packing, the correction of the Haymount STP flow, and the addition of Greenhost – Village Farms because of observed nutrient concentrations in the discharge. This model run also assumed that the Nutrient Policy and the WQMP regulation were adopted. Effluent loadings for cBOD<sub>5</sub> and Dissolved Oxygen were derived by multiplying the current concentration limits by the maximum permitted flow. For the facilities that are contained in the draft WQMP regulation, nutrient loadings were derived using the flows and loadings presented in draft regulation. For Four Winds Campground, nutrient loadings were derived using a total nitrogen concentration of 8.0 mg/L and a total phosphorus concentration of 1.0 mg/L based on the draft Nutrient Policy. For Hopyard Farm WWTP, nutrient loadings were derived using a total nitrogen concentration of 4.0 mg/L and a total phosphorus concentration of 0.3 mg/L based on what was the draft WQMP. Best professional judgement and actual effluent data were used to determine the loadings for Greenhost- Village Farms. There was a small excursion of the Migratory fish spawning an nursery dissolved oxygen concentration of  $\geq 6$  mg/L; the excursion was 5.6 mg/L. Staff did not change the BOD limits for the dischargers but recommended increased ambient monitoring of the upper tidal Rappahannock River.

### **Current Model Run Summary**

The model was run for the summer (May- October) period because this is the most critical time and when potential dissolved oxygen excursions have been noted during past model analyses. Historically, no problems have been noted with chlorophyll or dissolved oxygen in the winter runs. It should be noted that even before the model runs could be fully analyzed and other scenarios attempted, the computer that this model runs on began to fail. Opening the model output files is cumbersome, the computer locks up when you try to execute the model, so it is impossible to perform any additional modeling. The older programming (Leahy Fortran) used for the VIMS model no longer works on the newer computers.

Summer continues to be the critical period for the water quality of the upper tidal freshwater Rappahannock River because stream flows are typically lower and the dischargers have a greater influence on the water quality in the river, and alga growth is higher during the warmer temperatures of the summer months.

Staff ran a baseline run for the summer with Massaponax at 8 MGD; the baseline run did have the nitrogen allocations changed to reflect actual effluent quality. Runs were also done with Massaponax at 9.4 MGD, Massaponax at 9.4 MGD and all facilities meeting the WQMP conditions, all FMC flow moved to Massaponax, and all flow from FMC and the City of Fredericksburg moved to Massaponax.

### Chlorophyll a & Nutrients

When the WQMP is fully implemented, the model predicts chlorophyll a levels to drop substantially even when all the dischargers are at full capacity. The WQMP essentially reduces and places total nitrogen and total phosphorus loading caps on the significant dischargers. By removing these food sources for the algae, alga populations fall and thus, chlorophyll a levels are reduced. As noted earlier in this memorandum, staff also reallocated the nitrogen species based on the performance of the upgraded facilities. This also changed the output predictions from former analyses. It is staff's best professional judgment that moving the 1.4 MGD flow from FMC to Massaponax will not have any negative effects on the nutrients in the River.

### Dissolved Oxygen

Class II tidal waters in the Chesapeake Bay and its tidal tributaries must meet dissolved oxygen concentrations as specified in 9VAC25-260-185. In the Northern Virginia area, Class II waters must meet the Migratory Fish Spawning and Nursery Designated Use from February 1 through May 31. For the remainder of the year, these tidal waters must meet the Open Water use.

Designated Use	Criteria Concentration/Duration	Temporal Application
Migratory fish spawning and nursery	7-day mean > 6 mg/L (tidal habitats with 0-0.5 ppt salinity)	February 1 – May 31
	Instantaneous minimum > 5 mg/L	
Open-water <sup>1,2</sup>	30-day mean > 5.5 mg/L (tidal habitats with 0-0.5 ppt salinity)	Year-round
	30-day mean > 5 mg/L (tidal habitats with >0.5 ppt salinity)	
	7-day mean > 4 mg/L	
	Instantaneous minimum > 3.2 mg/L at temperatures < 29°C	
	Instantaneous minimum > 4.3 mg/L at temperatures > 29°C	
	1-day mean > 2.3 mg/L	
	Instantaneous minimum > 1.7 mg/L	

<sup>1</sup>See subsection aa of 9 VAC 25-260-310 for site specific seasonal open-water dissolved oxygen criteria applicable to the tidal Mattaponi and Pamunkey Rivers and their tidal tributaries.

<sup>2</sup>In applying this open-water instantaneous criterion to the Chesapeake Bay and its tidal tributaries where the existing water quality for dissolved oxygen exceeds an instantaneous minimum of 3.2 mg/L, that higher water quality for dissolved oxygen shall be provided antidegradation protection in accordance with section 30 subsection A.2 of the Water Quality Standards.

The model results show protection of the dissolved oxygen criteria except for the month of May in several segments. The current temporal application of the dissolved oxygen standards is different than the temporal application of the model, i.e., May is classified in the summer period. The migratory fish spawning and nursery Designated Use also looks at a 7-day mean, but the model only has a 30-day output. At this time, staff does not feel any changes are necessary to the cBOD limits for the dischargers because:

- 1) The excursion is very small; 5.6 mg/L is the predicted concentration in segment 13 when the Massaponax flow is at 9.4 and all facilities are at the WQMP loadings and concentrations.
- 2) The model is not that accurate to warrant substantial changes to the STPs to achieve such a small difference in dissolved oxygen. The accuracy of the model is questionable since it was developed over 20 years ago.
- 3) The model assumes May to be like July, August, and September, when in fact it is not, i.e., the water temperature is cooler and the background flows are higher.

### VIMS Model

Due to the age of the model and the development and changes that have occurred in the localities, staff will also inform the localities that any additional changes to design flows will require an update to the VIMS model. Staff recommends that the following be considered when the model is updated:

- 1) The model currently provides only a 30-day average output. It would be useful to have the ability to generate hourly, daily or other shorter averaging periods. If we had a more refined model, we would better understand the relationships between. DO, chlorophyll a, BOD, and nutrients.
- 2) Consider land use and hydrologic changes that have occurred and the associated changes to water flow, quantity and quality dynamics, especially since the Embury Dam has been removed from the River.



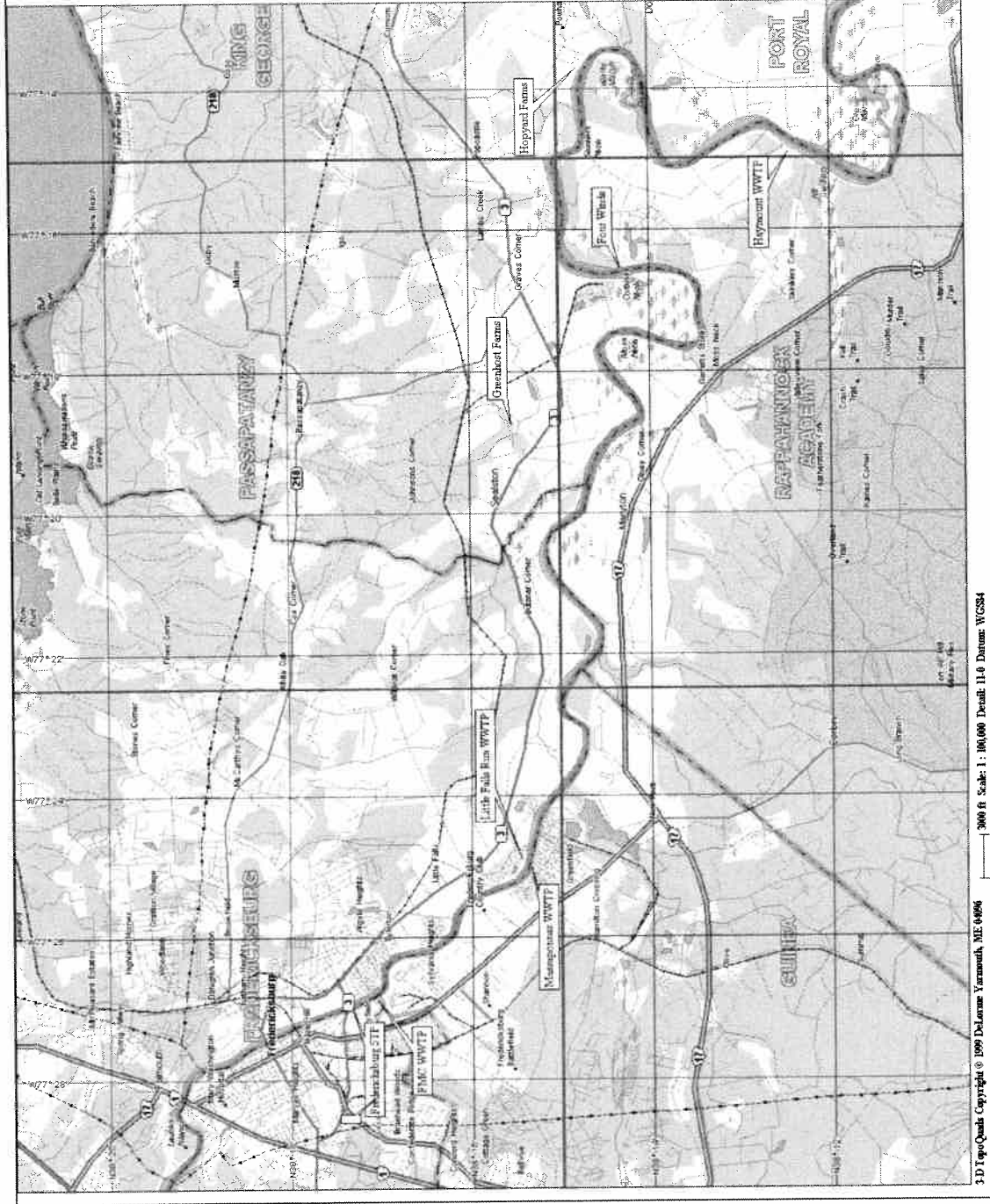


Figure 1  
Discharger Locations

Table 1  
Current Model Associated Limits for All Dischargers in VIMS Model

Discharger Permit No. Segment	Fredericksburg VA0025127	FMC VA0068110	Little Falls Run VA0076392	Massaponax VA0025658	Four Winds VA0060429	Hopyard Farm VA0089338	Haymount VA0089125
	3	4	9	9	20	23	26
River Mile	108.64	107.37	104.61	104.67	92.2	89.8	85.10
Flow (MGD)	4.5	5.4	13.0	9.4	0.210	0.50	0.96
BOD5 (mg/L, kg/d)	N/A	N/A	N/A	N/A	30/23.8	30/56.77	N/A
cBOD5 (mg/L, kg/d)	13.0 / 221	15.0 / 306.6	9.0 / 440	10.0 / 356	N/A	N/A	10.0 / 36
TKN (summer) (mg/L, kg/d)	7.0 / 119.23	3.0 / 61.3	6.0 / 295	9.0 / 320	2.29 / 1.82	N/A	3.0 / 10.9
TKN (winter) (mg/L, kg/d)	NL	N/A	NL	NL	3.41 / 2.71	N/A	N/A
Ammonia (summer) (mg/L, kg/d)	N/A	N/A	4.7	N/A	N/A	10.7 / 20.2	N/A
Ammonia (winter) (mg/L, kg/d)	N/A	N/A	4.7	12.0 / 427	N/A	12.4 / 23.4	N/A
Total Phosphorous (kg/d)	26.5	30.3	NL	45.4	1.59	3.78	7.3
Dissolved Oxygen (mg/L)	6.0	6.0	6.0	6.0	6.0	6.0	6.0

N/A – Not Applicable  
NL – No Limit

# MEMORANDUM

## DEPARTMENT OF ENVIRONMENTAL QUALITY

Northern Regional Office

13901 Crown Court

Woodbridge, VA 22193

(703) 583-3800

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**SUBJECT:** TOXICS MANAGEMENT PROGRAM DATA REVIEW  
Little Falls Run Wastewater Treatment Plant (VA0076392)  
**REVIEWER:** Douglas Frasier  
**DATE:** 27 January 2009  
**COPIES:** TMP file

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**PREVIOUS REVIEW:** 28 February 2008

### DATA REVIEWED:

This review covers the fourth annual chronic toxicity tests conducted in July 2008 for Outfall 001. The tests were performed on the 24-hour flow proportional composite samples of final effluent collected from the outfall, using *Ceriodaphnia dubia* and *Pimephales promelas* as the test species.

### DISCUSSION:

The results of these toxicity tests, along with the results of previous acute and chronic toxicity tests, conducted on effluent samples collected from Outfall 001, are summarized in Table 1.

The chronic toxicity of the effluent samples was determined with a 3-brood static daily renewal survival and reproduction chronic toxicity test using *C. dubia* as the test species and a 7-day static daily renewal survival and growth chronic test using *P. promelas*.

The test results indicate that the effluent samples do not exhibit toxicity to the test organisms.

### CONCLUSIONS:

The tests are valid and the results acceptable. The permittee has fulfilled the annual biomonitoring requirements of the permit.

## FACILITY INFORMATION

**FACILITY:** Little Falls Run Wastewater Treatment Plant

**LOCATION:** 952 Kings Highway; on State Route 3,  
1.25 miles east of State Routes 601, Stafford County

**VPDES#:** VA0076392

**TYPE OF FACILITY:** Municipal, major

**REGION/PERMIT WRITER:** NRO / Alison Thompson

**PERMIT EFFECTIVE DATE:** 6 June 2005

**SIC CODE/DESCRIPTION:** 4952 / sewage treatment Plant

**OUTFALL/FLOW (MGD):** Outfall 001/ 4.0 MGD

### TREATMENT:

Preliminary screening and grit removal, biological treatment using Schreiber counter-current low-load aeration system to provide some biological nutrient removal, followed by clarification, alum addition, tertiary filtration, UV light disinfection and post aeration. Sludge is digested aerobically, dewatered by centrifuges and land applied.

**RECEIVING STREAM/7Q10/IWC:** Rappahannock River; Rappahannock River basin;  
subbasin none; Section 1; Class II;  
Special Standards: a  
7Q10: 34.3 MGD  
IWC: 10.8%

**TMP EFFECTIVE DATE:** 21 June 1991

### TMP REQUIREMENTS:

Annual chronic toxicity tests for the duration of the permit, using 24-hour flow-proportioned composite samples of final effluent from outfall 001. The chronic toxicity tests shall consist of a 3-brood static daily renewal survival and reproduction chronic toxicity test using *C. dubia* as the test species and a 7-day static daily renewal survival and growth chronic test using *P. promelas*.

If any test fails (NOEC < IWC of 10.8% for chronic), that test shall be repeated within three months. If the retest passes, the annual compliance testing shall resume. However, if the retest fails, quarterly toxicity testing may be required.

**BIOLOGICAL TESTING PERFORMED BY:** James R. Reed & Associates

**BIOMONITORING RESULTS**  
**Little Falls Run Wastewater Treatment Plant (VA0076392)**

Table 1  
Summary of Toxicity Test Results for Outfall 001

TEST DATE	TEST TYPE/ORGANISM	IC <sub>25</sub> (%)	48-hour LC <sub>50</sub> (%)	NOEC (%)	% SURV	LAB	REMARKS
08/03/94	Acute <i>C. dubia</i>		>100		100	JRA	1st Annual
08/02/94	Chronic <i>C. dubia</i>			100 SR	100	JRA	
08/22/95	Acute <i>C. dubia</i>		>100		95	JRA	2nd Annual
08/17/95	Chronic <i>C. dubia</i>			100 SR	100	JRA	
08/02/96	Acute <i>C. dubia</i>		>100		100	JRA	3rd Annual
07/30/96	Chronic <i>C. dubia</i>			100 SR	100	JRA	
07/17/97	Acute <i>C. dubia</i>		>100		100	CBI	4th Annual
07/15/97	Chronic <i>C. dubia</i>			5.4 R	100	CBI	
08/27/97	Acute <i>C. dubia</i>		>100		95	CBI	retest
08/25/97	Chronic <i>C. dubia</i>			100 SR	100	CBI	
07/30/98	Acute <i>C. dubia</i>		>100		100	JRA	5th Annual
07/28/98	Chronic <i>C. dubia</i>			100 SR	100	JRA	
07/28/99	Acute <i>C. dubia</i>		>100		100	JRA	6th Annual
07/26/99	Chronic <i>C. dubia</i>			100 SR	100	JRA	
<b>Permit Reissued November 18, 1999</b>							
05/11/00	Acute <i>C. dubia</i>				100	JRA	1st Annual
05/09/00	Chronic <i>C. dubia</i>			100 SR	100	JRA	
06/21/01	Acute <i>C. dubia</i>		>100		100	JRA	2nd Annual
06/19/01	Chronic <i>C. dubia</i>	>100	>100	100 SR	100	JRA	
06/19/02	Acute <i>C. dubia</i>		>100		100	JRA	3rd Annual
06/18/02	Chronic <i>C. dubia</i>	8.47	>100	100 SR	90	JRA	
06/25/03	Acute <i>C. dubia</i>		>100		100	JRA	4th Annual
06/23/03	Chronic <i>C. dubia</i>	>100	>100	100 SR	80	JRA	
06/23/04	Acute <i>C. dubia</i>		>100		85	JRA	5th Annual
06/21/04	Chronic <i>C. dubia</i>	>100	>100	100 SR	90	JRA	
<b>Permit Reissued 6 June 2005</b>							
9/15/05	Chronic <i>C. dubia</i>	>100	>100	100 SR	100	JRA	1 <sup>st</sup> annual
9/15/05	Chronic <i>P. Promelas</i>	>100	>100	100 SG	100	JRA	
5/22/06	Chronic <i>C. dubia</i>	24.8	>100	100 S 12.5 R	100	JRA	2 <sup>nd</sup> annual
5/22/06	Chronic <i>P. Promelas</i>	10.1	>100	100 S 6.25 G	100	JRA	
10/9/06	Chronic <i>C. dubia</i>	>100	>100	100SR	100	JRA	retest
10/9/06	Chronic <i>P. Promelas</i>	>100	>100	100 SG	95	JRA	
05/15/07	Chronic <i>C. dubia</i>	>100	>100	100 SR	100	JRA	3 <sup>rd</sup> annual
05/15/07	Chronic <i>P. Promelas</i>	>100	>100	100 SG	100	JRA	
07/14/08	Chronic <i>C. dubia</i>	>100	>100	100 SR	100	JRA	4 <sup>th</sup> annual
07/14/08	Chronic <i>P. Promelas</i>	>100	>100	100 SG	97.5	JRA	

ABBREVIATIONS:

S – Survival; R – Reproduction; G – Growth  
% SURV - Percent survival in 100% effluent  
JRA - James R. Reed & Associates; CBI - Coastal Bioanalysts Inc.

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater/ into a water body in Stafford County, Virginia.

PUBLIC COMMENT PERIOD: XXX, 2010 to 5:00 p.m. on XXX, 2010

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: Stafford County Board of Supervisors, Department of Utilities, PO Box 339, Stafford, VA 22555-0339, VA0076392

NAME AND ADDRESS OF FACILITY: Little Falls Run WWTP, 952 Kings Hwy, Stafford VA

PROJECT DESCRIPTION: Stafford County has applied for a reissuance of a permit for the public Little Falls Run WWTP. The applicant proposes to release treated sewage wastewaters from residential areas at a rate of up to 13 million gallons per day into a water body; the current design flow of the facility is 4 million gallons per day. Sludge from the treatment process will be land applied by a licensed contractor. The facility proposes to release the treated sewage waters in the Rappahannock River in Stafford County in the Rappahannock River watershed. A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: pH, cBOD, Total Suspended Solids, TKN, Ammonia as N, Total Nitrogen, Total Phosphorus, E. coli, and Dissolved Oxygen.

This facility is subject to the requirements of 9 VAC 25-820 and has registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. DEQ may hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the documents at the DEQ-Northern Regional Office by appointment, or may request electronic copies of the draft permit and fact sheet.

Name: Alison Thompson

Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193

Phone: (703) 583-3834 E-mail: Alison.Thompson@deq.virginia.gov Fax: (703) 583-3821

**State "Transmittal Checklist" to Assist in Targeting  
Municipal and Industrial Individual NPDES Draft Permits for Review**

**Part I. State Draft Permit Submission Checklist**

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name:	Little Falls Run WWTP
NPDES Permit Number:	VA0076392
Permit Writer Name:	Alison L. Thompson
Date:	4/2/2010

**Major [X ]****Minor [ ]****Industrial [ ]****Municipal [X ]****I.A. Draft Permit Package Submittal Includes:**

	Yes	No	N/A
1. Permit Application?	X		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	X		
3. Copy of Public Notice?	X		
4. Complete Fact Sheet?	X		
5. A Priority Pollutant Screening to determine parameters of concern?	X		
6. A Reasonable Potential analysis showing calculated WQBELs?	X		
7. Dissolved Oxygen calculations?	X		
8. Whole Effluent Toxicity Test summary and analysis?	X		
9. Permit Rating Sheet for new or modified industrial facilities?			X

**I.B. Permit/Facility Characteristics**

	Yes	No	N/A
1. Is this a new, or currently unpermitted facility?		X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	X		
3. Does the fact sheet <b>or</b> permit contain a description of the wastewater treatment process?	X		
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?		X	
5. Has there been any change in streamflow characteristics since the last permit was developed?		X	
6. Does the permit allow the discharge of new or increased loadings of any pollutants?		X	
7. Does the fact sheet <b>or</b> permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	X		
8. Does the facility discharge to a 303(d) listed water?	X		
a. Has a TMDL been developed and approved by EPA for the impaired water?	X		
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?		X	
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?	X		
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?		X	
10. Does the permit authorize discharges of storm water?		X	

<b>I.B. Permit/Facility Characteristics – cont.</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		X	
12. Are there any production-based, technology-based effluent limits in the permit?		X	
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		X	
14. Are any WQBELs based on an interpretation of narrative criteria? Total Phos at 4 MGD	X		
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?		X	
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?	X		
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
20. Have previous permit, application, and fact sheet been examined?	X		

## Part II. NPDES Draft Permit Checklist

### Region III NPDES Permit Quality Checklist – for POTWs (To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	Yes	No	N/A
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		

II.B. Effluent Limits – General Elements	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	X		
2. Does the fact sheet discuss whether “antibacksliding” provisions were met for any limits that are less stringent than those in the previous NPDES permit?	X		

II.C. Technology-Based Effluent Limits (POTWs)	Yes	No	N/A
1. Does the permit contain numeric limits for <u>ALL</u> of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	X		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?	X		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			X
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	X		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	X		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		X	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			X

II.D. Water Quality-Based Effluent Limits	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	X		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?	X		
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a “reasonable potential” evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the “reasonable potential” evaluation was performed in accordance with the State’s approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have “reasonable potential”?	X		
d. Does the fact sheet indicate that the “reasonable potential” and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?	X		
e. Does the permit contain numeric effluent limits for all pollutants for which “reasonable potential” was determined?	X		

<b>II.D. Water Quality-Based Effluent Limits – cont.</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	X		
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	X		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	X		
8. Does the record indicate that an “antidegradation” review was performed in accordance with the State’s approved antidegradation policy?	X		

<b>II.E. Monitoring and Reporting Requirements</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	X		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	X		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?		X	
4. Does the permit require testing for Whole Effluent Toxicity?	X		

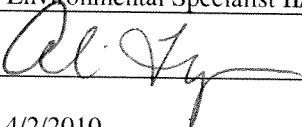
<b>II.F. Special Conditions</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
1. Does the permit include appropriate biosolids use/disposal requirements?	X		
2. Does the permit include appropriate storm water program requirements?	X		

<b>II.F. Special Conditions – cont.</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	X		
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?		X	
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?		X	
a. Does the permit require implementation of the “Nine Minimum Controls”?			X
b. Does the permit require development and implementation of a “Long Term Control Plan”?			X
c. Does the permit require monitoring and reporting for CSO events?			X
7. Does the permit include appropriate Pretreatment Program requirements?	X		

II.G. Standard Conditions		Yes	No	N/A
1. Does the <b>permit</b> contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?		X		
<b>List of Standard Conditions – 40 CFR 122.41</b>				
Duty to comply	Property rights	Reporting Requirements		
Duty to reapply	Duty to provide information	Planned change		
Need to halt or reduce activity	Inspections and entry	Anticipated noncompliance		
not a defense	Monitoring and records	Transfers		
Duty to mitigate	Signatory requirement	Monitoring reports		
Proper O & M	Bypass	Compliance schedules		
Permit actions	Upset	24-Hour reporting		
		Other non-compliance		
2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?				

### Part III. Signature Page

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	<u>Alison Thompson</u>
Title	<u>Environmental Specialist II/ Technical Reviewer</u>
Signature	<u></u>
Date	<u>4/2/2010</u>